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COMBAT TRAINING WITH PISTOLS, M9 AND M11

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CHAPTER 1
COMPONENTS AND FUNCTIONING

This chapter describes the M9 and M11 semiautomatic pistols, their maintenance requirements, and their operation and functioning.

Section I. DESCRIPTION AND COMPONENTS

The M9 (Figure 1-1) and M11 (Figure 1-2) pistols are 9-mm, semiautomatic, magazine-fed, recoil-operation, double-action weapons chambered for the 9-mm cartridge.

Figure 1-1. 9-mm pistol, M9.

Figure 1-2. 9-mm pistol, M11.

1-1. DESCRIPTION

Table 1-1 summarizes equipment data for both pistols.

	M9 PISTOL	M11 PISTOL
Caliber	9-mm NATO	9-mm NATO
System of Operation	Short recoil, semiautomatic	Short recoil, semiautomatic
Locking System	Oscillating block	Oscillating block
Length	217 mm (8.54 inches)	180 mm (7.08 inches)
Width	38 mm (1.5 inches)	37 mm (1.46 inches)
Height	140 mm (5.51 inches)	136 mm (5.35 inches)
Magazine Capacity	**15 Rounds**	**13 Rounds**
Weight with Empty Magazine	960 grams (2.1 pounds)	745 grams (26.1 oz.)
Weight with 15-Round Magazine	1,145 grams (2.6 pounds)	830 grams (29.1 oz.)
Barrel Length	125 mm (4.92 inches)	98 mm (3.86 inches)
Rifling	Right-hand, six-groove (pitch 250 mm [about 10 inches])	Right-hand, six-groove (pitch 250 mm [9.84 inches])
Muzzle Velocity	375 meters per second (1,230.3 feet per second)	375 meters per second (1,230.3 feet per second)
Muzzle Energy	569.5 Newton meters (430 foot pounds)	569.5 Newton meters (430 foot pounds)
Maximum Range	1,800 meters (1,962.2 yards)	1,800 meters (1,962.2 yards)
Maximum Effective Range	50 meters (54.7 yards)	50 meters (54.7 yards)
Front Sight	Blade, integral with slide	Blade, integral with slide
Rear Sight	Notched bar, dovetailed to slide	Notched bar, dovetailed to slide
Sighting Radius	158 mm (6.22 inches)	158 mm (6.22 inches)
Safety Features	Decocking/safety lever, firing pin block.	Decocking/safety lever, firing pin block.
Hammer (half-cocked notch)	Prevents accidental discharge.	Prevents accidental discharge.
Basic Load	45 rounds	45 rounds
Trigger Pull	Single-action: 5.50 pounds Double-action: 12.33 pounds	Single-Action: 4.40 pounds Double-Action: 12.12 pounds

Table 1-1. Equipment Data, M9 and M11 pistols.

NOTE: For additional information on technical aspects of the M9 pistol, see TM 9-1005-317-10. For additional information on technical aspects of the M11 pistol, see TM 9-1005-325-10.

WARNING

The half-cocked position catches the hammer and prevents it from firing if the hammer is released while manually cocking the weapon. It is not to be used as a safety position. The pistol will fire from the half-cocked position if the trigger is pulled.

1-2. COMPONENTS

The major components of the M9 (Figure 1-3) and M11 (Figure 1-4) pistols are:

a. **Slide and Barrel Assembly**: Houses the firing pin, striker, and extractor. Cocks the hammer during recoil cycle.

b. **Recoil Spring and Recoil Spring Guide**: Absorbs recoil and returns the slide assembly to its forward position.

c. **Barrel and Locking Block Assembly**: Houses cartridge for firing, directs projectile, and locks barrel in position during firing.

d. **Receiver**: Serves as a support for all the major components. Houses action of the pistol through four major components. Controls functioning of the pistol.

e. **Magazine**: Holds cartridges in place for stripping and chambering.

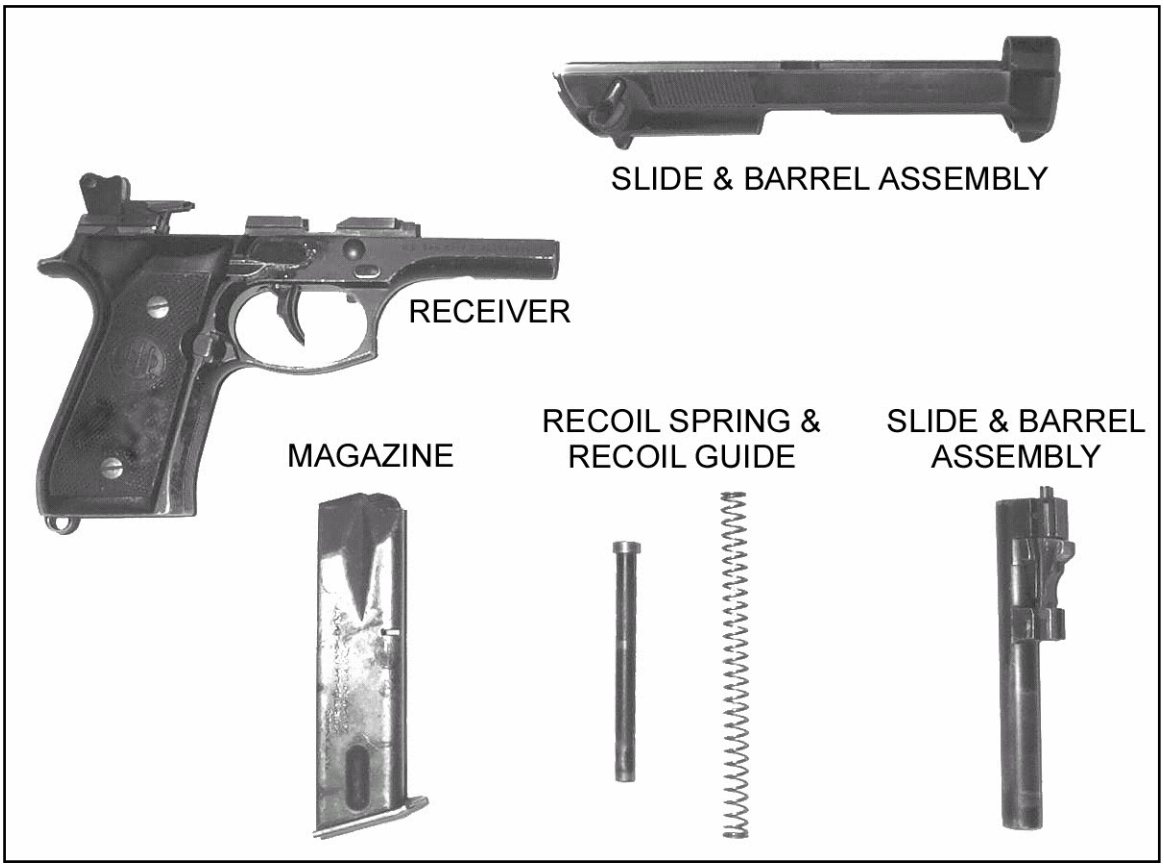

Figure 1-3. Major components, M9.

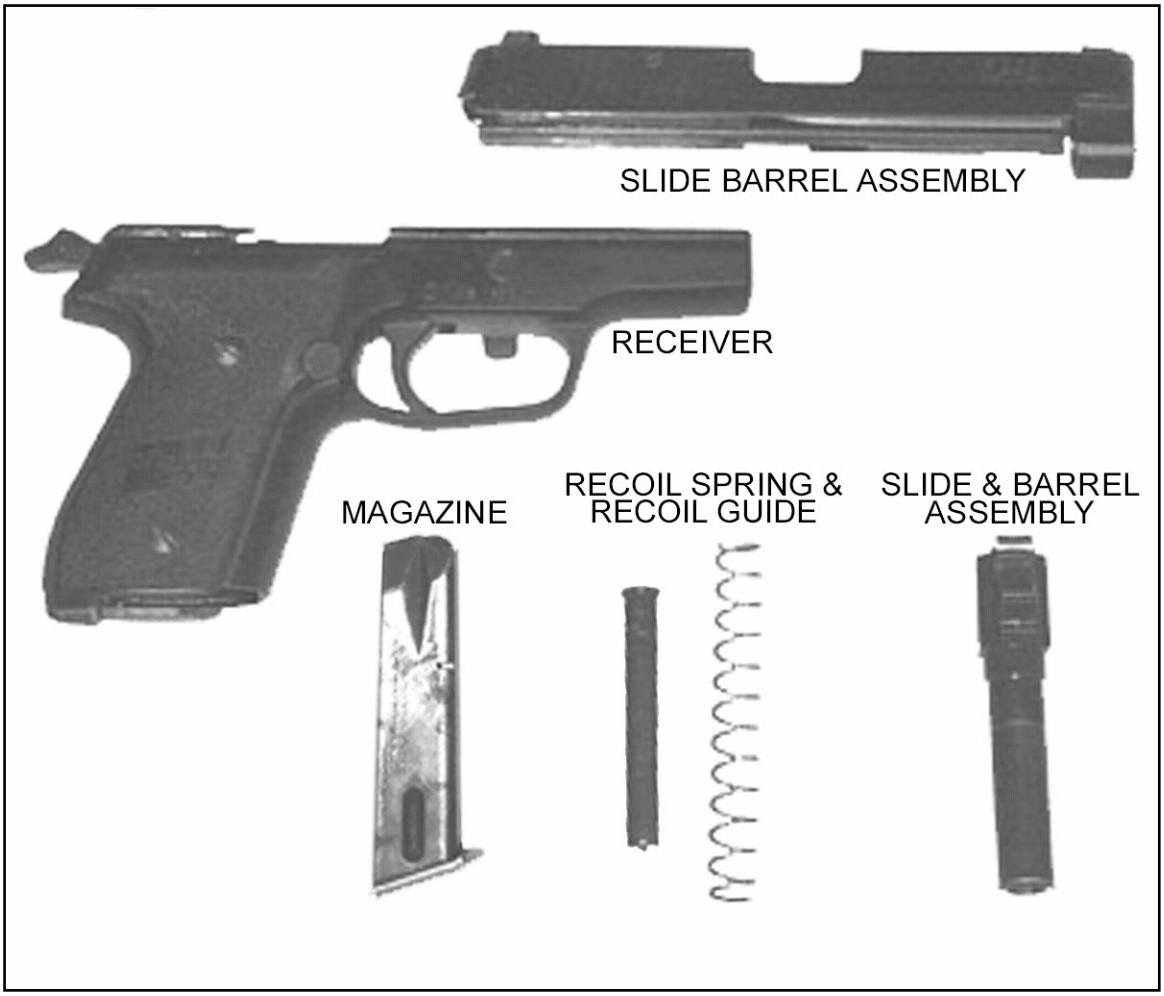

Figure 1-4. Major components, M11.

1-3. AMMUNITION

M9 and M11 pistols use several different types of 9-mm ammunition. Soldiers should use only authorized ammunition that is manufactured to US and NATO specifications.

a. **Type and Characteristics**. The specific type ammunition (Figure 1-5) and its characteristics are as follows:

(1) Cartridge, 9-mm ball, M882 with/without cannelure).

(2) Cartridge, 9-mm dummy, M917.

WARNING

Do not fire heavily corroded or dented cartridges, cartridges with loose bullets, or any other rounds detected as defective through visual inspection.

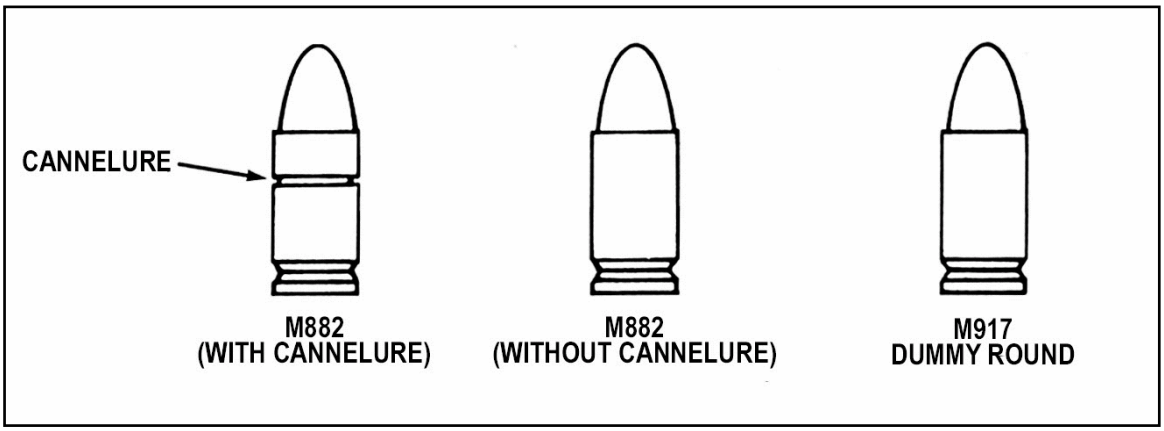

Figure 1-5. Ammunition.

b. **Care, Handling, and Preservation**.

(1) Protect ammunition from mud, sand, and water. If the ammunition gets wet or dirty, wipe it off at once with a clean dry cloth. Wipe off light corrosion as soon as it is discovered. Turn in heavily corroded cartridges.

(2) Do not expose ammunition to the direct rays of the sun. If the powder is hot, excessive pressure may develop when the pistol is fired.

(3) Do not oil or grease ammunition. Dust and other abrasives that collect on greasy ammunition may cause damage to the operating parts of the pistol. Oiled cartridges produce excessive chamber pressure.

Section II. MAINTENANCE

Maintenance procedures include clearing, dissembling, inspecting, cleaning, lubricating, assembling, and checking the functioning of the M9 or M11 pistol.

1-4. CLEARING PROCEDURES

The first step in maintenance is to clear the weapon. This applies in all situations, not just after firing. Soldiers must always assume the weapon is loaded. To clear the pistol, perform the following procedures.

a. Place the decocking/safety lever in the SAFE down position.
b. Hold the pistol in the raised pistol position.
c. Depress the magazine release button and remove the magazine from the pistol.
d. Pull the slide to the rear and remove any chambered round.
e. Push the slide stop up, locking the slide to the rear.
f. Look into the chamber to ensure that it is empty.

1-5. GENERAL DISASSEMBLE

To disassemble the pistol, perform the following procedures.

a. Depress the slide stop and let the slide go forward.
b. Hold the pistol in the right hand with the muzzle slightly raised.
c. Press the disassembly lever button with the forefinger.
d. Rotate the disassembly lever downward until it stops.
e. Pull the slide and barrel assembly forward and remove it from the receiver.

f. Carefully and lightly compress the recoil spring and spring guide. At the same time, lift up and remove them.
g. Separate the recoil spring from the spring guide.
h. Push in on the locking block plunger while pushing the barrel forward slightly.
i. Lift and remove the locking block and barrel assembly from the slide.

1-6. INSPECTION

Inspection begins with the pistol disassembled in its major components. Shiny surfaces do not mean the parts are unserviceable. Inspect all surfaces for visible damage, cracks, burrs, and chips.

1-7. CLEANING, LUBRICATION, AND PREVENTIVE MAINTENANCE

The M9 or M11 pistol should be disassembled into its major components and cleaned immediately after firing. All metal components and surfaces that have been exposed to powder fouling should be cleaned using CLP on a bore-cleaning patch. The same procedure is used to clean the receiver. After it has been cleaned and wiped dry, a thin coat of CLP is applied by rubbing with a cloth. This lubricates and preserves the exposed metal parts during all normal temperature ranges. When not in use, the pistol should be inspected weekly and cleaned and lubricated when necessary.

CAUTION
When using CLP, do not use any other type cleaner. Never mix CLP with RBC or LSA.

a. Clear and disassemble the weapon.
b. Wipe or brush dirt, dust, and carbon buildup from the disassembled pistol.
c. Use CLP to help remove carbon buildup and stubborn dirt and grime.
d. Pay particular attention to the bolt face, guide rails on the receiver, grooves on the slide, and other hard-to-reach areas.

NOTE: Do not use mineral spirits, paint thinner, or dry cleaning solvent to clean the pistol. Use only issued lubricants and cleaners, such as CLP or LSA.

e. Clean the bore and chamber using CLP and fresh swabs.
f. Lubricate the pistol by covering all surfaces including the bore and chamber with a light coat of CLP. In extremely hot or cold weather, refer to the technical manual for lubricating procedures and materials.

1-8. GENERAL ASSEMBLY

To assemble the M9 or M11 pistol, simply reverse the procedures used to disassemble the pistol.
a. Grasp the slide with the bottom facing up.
b. With the other hand, grasp the barrel assembly with the locking block facing up.

c. Insert the muzzle into the forward end of the slide and, at the same time, lower the rear of the barrel assembly by aligning the extractor cutout with the extractor.

NOTE: The locking block will fall into the locked position in the slide.

d. Insert the recoil spring onto the recoil spring guide.

CAUTION
Maintain spring tension until the spring guide is fully seated in the cutaway on the locking block.

e. Insert the end of the recoil spring and the recoil spring guide into the recoil spring housing. At the same time, compress the recoil spring guide until it is fully seated on the locking block cutaway.

CAUTION
Do not pull the trigger while placing the slide on the receiver.

f. Ensure that the hammer is unlocked, the firing pin block is in the DOWN position, and the decocking/safety lever is in the SAFE position.

g. Grasp the slide and barrel assembly with the sights UP, and align the slide on the receiver assembly guide rails.

h. Push until the rear of the slide is a short distance beyond the rear of the receiver assembly and hold. At the same time, rotate the disassembly latch lever upward. A click indicates a positive lock.

1-9. FUNCTION CHECK

Always perform a function check after the pistol is reassembled to ensure it is working properly. To perform a function check:

a. Clear the pistol in accordance with the unloading procedures.
b. Depress the slide stop, letting the slide go forward.
c. Insert an empty magazine into the pistol.
d. Retract the slide fully and release it. The slide should lock to the rear.
e. Depress the magazine release button and remove the magazine.
f. Ensure the decocking/safety lever is in the SAFE position.
g. Depress the slide stop. When the slide goes forward, the hammer should fall to the forward position.
h. Squeeze and release the trigger. The firing pin block should move up and down and the hammer should not move.
i. Place the decocking/safety lever in the fire POSITION.
j. Squeeze the trigger to check double action. The hammer should cock and fall.
k. Squeeze the trigger again. Hold it to the rear. Manually retract and release the slide. Release the trigger. A click should be heard and the hammer should not fall.
l. Squeeze the trigger to check the single action. The hammer should fall.

Section III. OPERATION AND FUNCTION

This section provides detailed information on the functioning of M9 and M11 pistols.

1-10. OPERATION

With the weapon loaded and the hammer cocked, the shot is discharged by pulling the trigger.

a. Trigger movement is transmitted by the trigger bar, which draws the sear out of register with the full-cock hammer notch via the safety lever. With a slight timing lag, the safety lever also cams the safety lock upward to free the firing pin immediately before the hammer drops. The hammer forces the firing pin forward to strike and detonate the cartridge primer.

b. Blowback reaction generated by the exploding charge thrusts the locked barrel/slide system rearward against the recoil spring. After recoiling about 3 mm (1/8"), the barrel and slide unlock, allowing the barrel to tilt down into the locked position. The slide continues rearward until it abuts against the receiver stop.

c. During slide recoil, the hammer is cocked; the spent case is extracted and ejected as it strikes the ejector. In the initial recoil phase, the safety lever and safety lock separate, automatically rendering the firing pin safety lock effective again. As recoil continues, the slide depresses the trigger bar, disconnecting it from the safety lever. Sear spring pressure returns the sear and safety lever to their initial positions.

d. After contacting the receiver stop, the slide is thrust forward by the compressed recoil spring, stripping a round from the magazine and chambering it on the way. Just before reaching the forward end position, the slide again locks up with the barrel. The complete system is then thrust fully into the forward battery position by recoil spring pressure. Releasing the trigger allows the trigger bar and safety lever to re-engage.

e. The weapon is now cocked and ready to fire. After firing the last shot, the slide is locked in the rearmost position by the slide catch lever. This catch is actuated positively by the magazine follower, which is raised by magazine spring pressure.

1-11. LOADING

To load the pistol--

- Hold the pistol in the raised pistol position.
- Insert the magazine into the pistol.
- Pull the slide to the rear and release the slide to chamber a round.
- Push the decocking/safety lever to the SAFE position.

a. Always make sure the muzzle is pointing in a safe direction, with the finger off the trigger.

b. Never attempt to load or unload any firearm inside a vehicle, building, or other confined space (except a properly constructed shooting range or bullet trap). Enclosed areas frequently offer no completely safe direction in which to point the firearm; if an accidental discharge occurs, there is great risk of injury or property damage.

c. Before loading, always clean excess grease and oil from the bore and chamber, and ensure that no obstruction is in the barrel. Any foreign matter in the barrel could result in a bulged or burst barrel or other damage to the firearm and could cause serious injury to the shooter or to others.

1-12. UNLOADING AND CLEARING

To unload and clear the pistol--

- Hold the pistol in the raised pistol position.
- Depress the magazine release button and remove the magazine.
- Pull the slide to the rear and lock it in its rearward position by pushing up on the slide stop.
- Point the pistol skyward and look into the chamber to ensure it is clear.
- Let the slide go forward and pull the trigger to release the spring tension.

a. Perform this task in an area designated for this process.

b. Keep your finger off the trigger, and always make sure the muzzle is pointed in a safe direction.

c. Remember to clear the chamber after removing the magazine.

d. Never assume that a pistol is unloaded until you have personally checked it both visually and physically.

e. After every shooting practice, make a final check to be certain the firearm is unloaded before leaving the range.

1-13. CYCLE OF OPERATION

Each time a cartridge is fired, the parts inside the weapon function in a given order. This is known as the functioning cycle or cycle of operation. The cycle of operation of the weapon is divided into eight steps: feeding, chambering, locking, firing, unlocking, extracting, ejecting, and cocking. The steps are listed in the order in which functioning occurs; however, more than one step may occur at the same time.

a. A magazine containing ammunition is placed in the receiver. The slide is pulled fully to the rear and released. As the slide moves forward, it strips the top round from the magazine and pushes it into the chamber. The hammer remains in the cocked position, and the weapon is ready to fire.

b. The weapon fires one round each time the trigger is pulled. Each time a cartridge is fired, the slide and barrel recoil or move a short distance locked together. This permits the bullet and expanding powder gases to escape from the muzzle before the unlocking is completed.

c. The barrel then unlocks from the slide and continues to the rear, extracting the cartridge case from the chamber and ejecting it from the weapon. During this rearward movement, the magazine feeds another cartridge, the recoil spring is compressed, and the hammer is cocked.

d. At the end of the rearward movement, the recoil spring expands, forcing the slide forward, locking the barrel and slide together. The weapon is ready to fire again. The same cycle of operation continues until the ammunition is expended.

e. As the last round is fired, the magazine spring exerts upward pressure on the magazine follower. The stop on the follower strikes the slide stop, forcing it into the recess on the bottom of the slide and locking the slide to the rear. This action indicates that the magazine is empty and aids in faster reloading.

Section IV. PERFORMANCE PROBLEMS

Possible performance problems of M9 and M11 pistols are sluggish operation and stoppages. This section discusses immediate and remedial action to correct such problems.

1-14. MALFUNTIONS

The following malfunctions may occur to the M9 and M11 pistols. Take these corrective actions to correct any problems that may occur.

a. **Sluggish Operation**. Sluggish operation is usually due to excessive friction caused by carbon build up, lack of lubrication, or burred parts. Corrective action includes cleaning, lubricating, inspecting, and replacing parts as necessary.

b. **Stoppages**. A stoppage is an interruption in the cycle of operation caused by faulty action of the pistol or faulty ammunition. Types of stoppages are:

- Failure to feed.
- Failure to chamber.
- Failure to lock.
- Failure to fire.
- Failure to unlock.
- Failure to extract.
- Failure to eject.
- Failure to cock.

1-15. IMMEDIATE ACTION

Immediate action is the action taken to reduce a stoppage without looking for the cause. Immediate action is taken within 15 seconds of a stoppage.

a. Ensure the decocking/safety lever is in the FIRE position.

b. Squeeze the trigger again.

c. If the pistol does not fire, ensure that the magazine is fully seated, retract the slide to the rear, and release.

d. Squeeze the trigger.

e. If the pistol again does not fire, remove the magazine and retract the slide to eject the chambered cartridge. Insert a new magazine, retract the slide, and release to chamber another cartridge.

f. Squeeze the trigger.

g. If the pistol still does not fire, perform remedial action.

1-16. REMEDIAL ACTION

Remedial action is the action taken to reduce a stoppage by looking for the cause.

a. Clear the pistol.

b. Inspect the pistol for the cause of the stoppage.

c. Correct the cause of the stoppage, load the pistol, and fire.

d. If the pistol again fails to fire, disassemble it for closer inspection, cleaning, and lubrication.

CHAPTER 2
PISTOL MARKSMANSHIP TRAINING

Marksmanship training is divided into two phases: preparatory marksmanship training and range firing. Each phase may be divided into separate instructional steps. All marksmanship training must be progressive. Combat marksmanship techniques should be practiced after the basics have been mastered.

Section I. BASIC MARKSMANSHIP

The main use of the pistol is to engage an enemy at close range with quick, accurate fire. Accurate shooting results from knowing and correctly applying the elements of marksmanship. The elements of combat pistol marksmanship are:

- Grip.
- Aiming.
- Breath control.
- Trigger squeeze.
- Target engagement.
- Positions.

2-1. GRIP

A proper grip is one of the most important fundamentals of quick fire. The weapon must become an extension of the hand and arm; it should replace the finger in pointing at an object. The firer must apply a firm, uniform grip to the weapon.

a. **One-Hand Grip**. Hold the weapon in the nonfiring hand; form a V with the thumb and forefinger of the strong hand (firing hand). Place the weapon in the V with the front and rear sights in line with the firing arm. Wrap the lower three fingers around the pistol grip, putting equal pressure with all three fingers to the rear. Allow the thumb of the firing hand to rest alongside the weapon without pressure (Figure 2-1). Grip the weapon tightly until the hand begins to tremble; relax until the trembling stops. At this point, the necessary pressure for a proper grip has been applied. Place the trigger finger on the trigger between the tip and second joint so that it can be squeezed to the rear. The trigger finger must work independently of the remaining fingers.

NOTE: If any of the three fingers on the grip are relaxed, the grip must be reapplied.

Figure 2-1. One-hand grip.

b. **Two-Hand Grip**. The two-hand grip allows the firer to steady the firing hand and provide maximum support during firing. The nonfiring hand becomes a support mechanism for the firing hand by wrapping the fingers of the nonfiring hand around the firing hand. Two-hand grips are recommended for all pistol firing.

WARNING

Do not place the nonfiring thumb in the rear of the weapon. The recoil upon firing could result in personal injury.

(1) ***Fist Grip***. Grip the weapon as with the one-hand grip. Firmly close the fingers of the nonfiring hand over the fingers of the firing hand, ensuring that the index finger from the nonfiring hand is between the middle finger of the firing hand and the trigger guard. Place the nonfiring thumb alongside the firing thumb (Figure 2-2).

NOTE: Depending upon the individual firer, he may chose to place the index finger of his nonfiring hand on the front of the trigger guard since M9 and M11 pistols have a recurved trigger guard designed for this purpose.

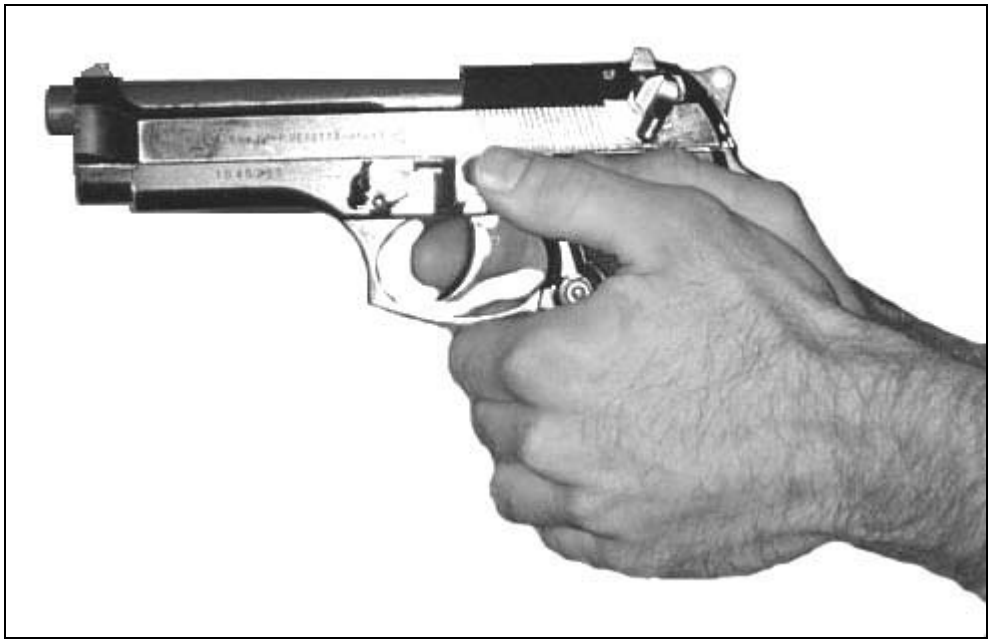

Figure 2-2. Fist grip.

(2) ***Palm-Supported Grip***. This grip is commonly called the cup and saucer grip. Grip the firing hand as with the one-hand grip. Place the nonfiring hand under the firing hand, wrapping the nonfiring fingers around the back of the firing hand. Place the nonfiring thumb over the middle finger of the firing hand (Figure 2-3).

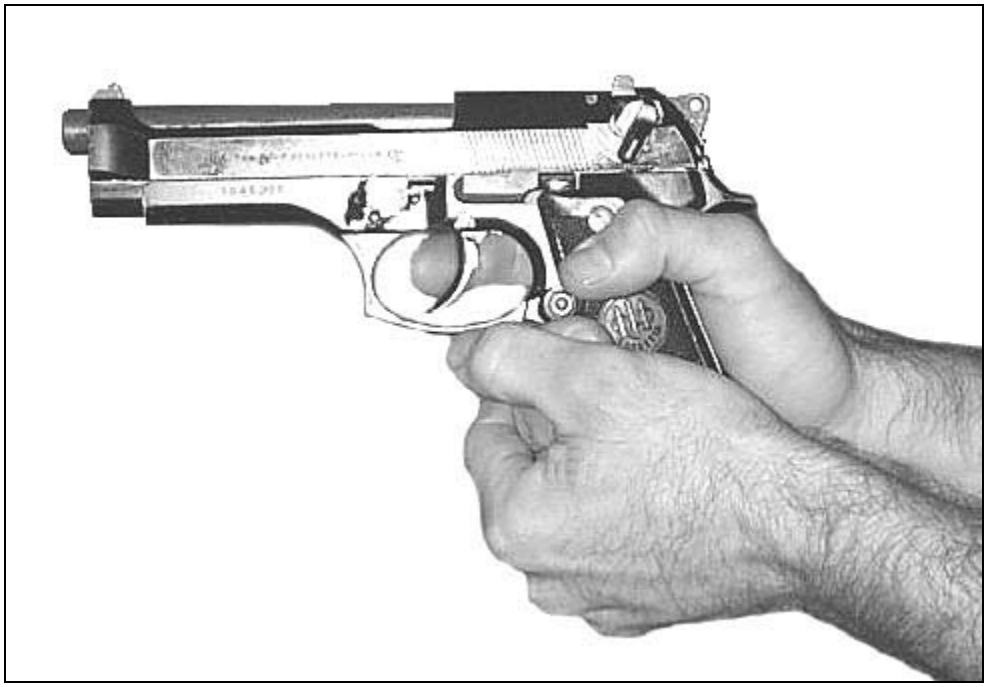

Figure 2-3. Palm-supported grip.

(3) ***Weaver grip***. Apply this grip the same as the fist grip. The only exception is that the nonfiring thumb is wrapped over the firing thumb (Figure 2-4).

Figure 2-4. Weaver grip.

c. **Isometric Tension**. The firer raises his arms to a firing position and applies isometric tension. This is commonly known as the push-pull method for maintaining weapon stability. Isometric tension is when the firer applies forward pressure with the firing hand and pulls rearward with the nonfiring hand with equal pressure. This creates an isometric force but never so much to cause the firer to tremble. This steadies the weapon and reduces barrel rise from recoil. The supporting arm is bent with the elbow pulled downward. The firing arm is fully extended with the elbow and wrist locked. The firer must experiment to find the right amount of isometric tension to apply.

NOTE: The firing hand should exert the same pressure as the nonfiring hand. If it does not, a missed target could result.

d. **Natural Point of Aim**. The firer should check his grip for use of his natural point of aim. He grips the weapon and sights properly on a distant target. While maintaining his grip and stance, he closes his eyes for three to five seconds. He then opens his eyes and checks for proper sight picture. If the point of aim is disturbed, the firer adjusts his stance to compensate. If the sight alignment is disturbed, the firer adjusts his grip to compensate by removing the weapon from his hand and reapplying the grip. The firer repeats this process until the sight alignment and sight placement remain almost the same when he opens his eyes. With sufficient practice, this enables the firer to determine and use his natural point of aim, which is the most relaxed position for holding and firing the weapon.

2-2. AIMING

Aiming is sight alignment and sight placement (Figure 2-5).

a. Sight alignment is the centering of the front blade in the rear sight notch. The top of the front sight is level with the top of the rear sight and is in correct alignment with the eye. For correct sight alignment, the firer must center the front sight in the rear sight. He raises or lowers the top of the front sight so it is level with the top of the rear sight. Sight alignment is essential for accuracy because of the short sight radius of the pistol. For example, if a 1/10-inch error is made in aligning the front sight in the rear sight, the firer's bullet will miss the point of aim by about 15 inches at a range of 25 meters. The 1/10-inch error in sight alignment magnifies as the range increases--at 25 meters, it is magnified 150 times.

b. Sight placement is the positioning of the weapon's sights in relation to the target as seen by the firer when he aims the weapon (Figure 2-5). A correct sight picture consists of correct sight alignment with the front sight placed center mass of the target. The eye can focus on only one object at a time at different distances. Therefore, the last focus of the eye is always on the front sight. When the front sight is seen clearly, the rear sight and target will appear hazy. The firer can maintain correct sight alignment only through focusing on the front sight. His bullet will hit the target even if the sight picture is partly off center but still remains on the target. Therefore, sight alignment is more important than sight placement. Since it is impossible to hold the weapon completely still, the firer must apply trigger squeeze and maintain correct sight alignment while the weapon is moving in and around the center of the target. This natural movement of the weapon is referred to as wobble area. The firer must strive to control the limits of the wobble area through proper grip, breath control, trigger squeeze, and positioning.

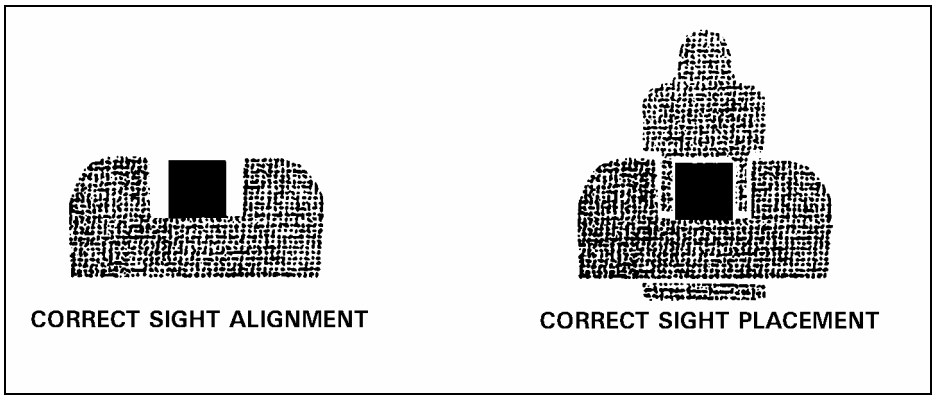

Figure 2-5. Correct sight alignment and sight picture.

c. Focusing on the front sight while applying proper trigger squeeze will help the firer resist the urge to jerk the trigger and anticipate the moment the weapon will fire. Mastery of trigger squeeze and sight alignment requires practice. Trainers should use concurrent training stations or have fire ranges to enhance proficiency of marksmanship skills.

2-3. BREATH CONTROL

To attain accuracy, the firer must learn to hold his breath properly at any time during the breathing cycle. This must be done while aiming and squeezing the trigger. While the procedure is simple, it requires explanation, demonstration, and supervised practice. To hold his breath properly, the firer takes a breath, lets it out, then inhales normally, lets a little out until comfortable, holds, and then fires. It is difficult to maintain a steady position keeping the front sight at a precise aiming point while breathing. Therefore, the firer should be taught to inhale, then exhale normally, and hold his breath at the moment of the natural respiratory pause (Figure 2-6). Breath control, firing at a single target.) The shot must then be fired before he feels any discomfort from not breathing. When multiple targets are presented, the firer must learn to hold his breath at any part of the breathing cycle (Figure 2-7). Breath control must be practiced during dry-fire exercises until it becomes a natural part of the firing process.

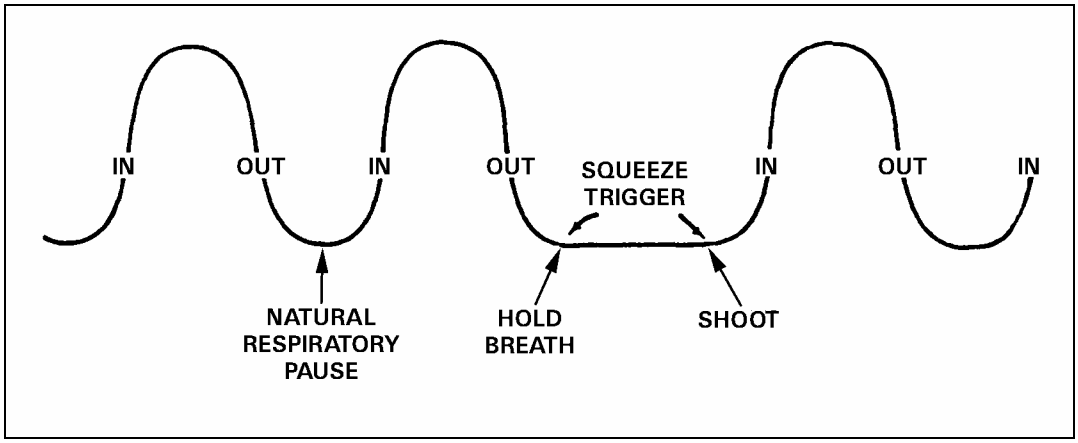

Figure 2-6. Breath control, firing at a single target.

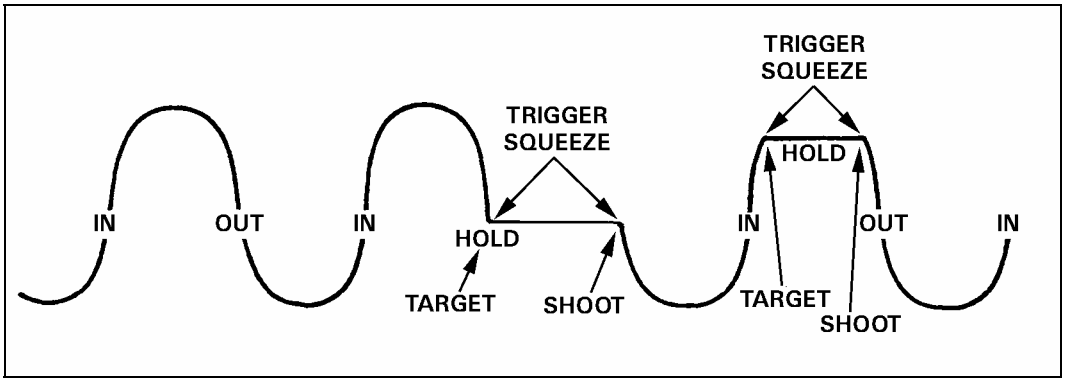

Figure 2-7. Breath control, firing at timed or multiple targets.

2-4. TRIGGER SQUEEZE

Improper trigger squeeze causes more misses than any other step of preparatory marksmanship. Poor shooting is caused by the aim being disturbed before the bullet leaves the barrel of the weapon. This is usually the result of the firer jerking the trigger or flinching. A slight off-center pressure of the trigger finger on the trigger can cause the weapon to move and disturb the firer's sight alignment. Flinching is an automatic human

reflex caused by anticipating the recoil of the weapon. Jerking is an effort to fire the weapon at the precise time the sights align with the target. For more on problems in target engagement, see paragraph 2-5.

a. Trigger squeeze is the independent movement of the trigger finger in applying increasing pressure on the trigger straight to the rear, without disturbing the sight alignment until the weapon fires. The trigger slack, or free play, is taken up first, and the squeeze is continued steadily until the hammer falls. If the trigger is squeezed properly, the firer will not know exactly when the hammer will fall; thus, he will not tend to flinch or heel, resulting in a bad shot. Novice firers must be trained to overcome the urge to anticipate recoil. Proper application of the fundamentals will lower this tendency.

b. To apply correct trigger squeeze, the trigger finger should contact the trigger between the tip of the finger and the second joint (without touching the weapon anywhere else). Where contact is made depends on the length of the firer's trigger finger. If pressure from the trigger finger is applied to the right side of the trigger or weapon, the strike of the bullet will be to the left. This is due to the normal hinge action of the fingers. When the fingers on the right hand are closed, as in gripping, they hinge or pivot to the left, thereby applying pressure to the left (with left-handed firers, this action is to the right). The firer must not apply pressure left or right but should increase finger pressure straight to the rear. Only the trigger finger should perform this action. Dry-fire training improves a firer's ability to move the trigger finger straight to the rear without cramping or increasing pressure on the hand grip.

c. Follow-through is the continued effort of the firer to maintain sight alignment before, during, and after the round has fired. The firer must continue the rearward movement of the finger even after the round has been fired. Releasing the trigger too soon after the round has been fired results in an uncontrolled shot, causing a missed target.

(1) The firer who is a good shot holds the sights of the weapon as nearly on the target center as possible and continues to squeeze the trigger with increasing pressure until the weapon fires.

(2) The soldier who is a bad shot tries to "catch his target" as his sight alignment moves past the target and fires the weapon at that instant. This is called ambushing, which causes trigger jerk.

NOTE: The trigger squeeze of the pistol, when fired in the single-action mode, is 5.50 pounds; when fired in double-action mode, it is 12.33 pounds. The firer must be aware of the mode in which he is firing. He must also practice squeezing the trigger in each mode to develop expertise in both single-action and double-action target engagements.

2-5. TARGET ENGAGEMENT

To engage a single target, the firer applies the method discussed in paragraph 2-4. When engaging multiple targets in combat, he engages the closest and most dangerous multiple target first and fires at it with two rounds. This is called controlled pairs. The firer then traverses and acquires the next target, aligns the sights in the center of mass, focuses on the front sight, applies trigger squeeze, and fires. He ensures his firing arm elbow and wrist are locked during all engagements. If he has missed the first target and has fired

upon the second target, he shifts back to the first and engages it. Some problems in target engagement are as follows:

a. **Recoil Anticipation**. When a soldier first learns to shoot, he may begin to anticipate recoil. This reaction may cause him to tighten his muscles during or just before the hammer falls. He may fight the recoil by pushing the weapon downward in anticipating or reacting to its firing. In either case, the rounds will not hit the point of aim. A good method to show the firer that he is anticipating the recoil is the ball-and-dummy method (see paragraph 2-14).

b. **Trigger Jerk**. Trigger jerk occurs when the soldier sees that he has acquired a good sight picture at center mass and "snaps" off a round before the good sight picture is lost. This may become a problem, especially when the soldier is learning to use a flash sight picture (see paragraph 2-7b).

c. **Heeling**. Heeling is caused by a firer tightening the large muscle in the heel of the hand to keep from jerking the trigger. A firer who has had problems with jerking the trigger tries to correct the fault by tightening the bottom of the hand, which results in a heeled shot. Heeling causes the strike of the bullet to hit high on the firing hand side of the target. The firer can correct shooting errors by knowing and applying correct trigger squeeze.

2-6. POSITIONS

The qualification course is fired from a standing, kneeling, or crouch position. During qualification and combat firing, soldiers must practice all of the firing positions described below so they become natural movements. Though these positions seem natural, practice sessions must be conducted to ensure the habitual attainment of correct firing positions. Practice in assuming correct firing positions ensures that soldiers can quickly assume these positions without a conscious effort. Pistol marksmanship requires a soldier to rapidly apply all the fundamentals at dangerously close targets while under stress. Assuming a proper position to allow for a steady aim is critical to survival.

NOTE: During combat, there may not be time for a soldier to assume a position that will allow him to establish his natural point of aim. Firing from a covered position may require the soldier to adapt his shooting stance to available cover.

a. **Pistol-Ready Position**. In the pistol-ready position, hold the weapon in the one-hand grip. Hold the upper arm close to the body and the forearm at about a 45-degree angle. Point the weapon toward target center as you move forward (Figure 2-8).

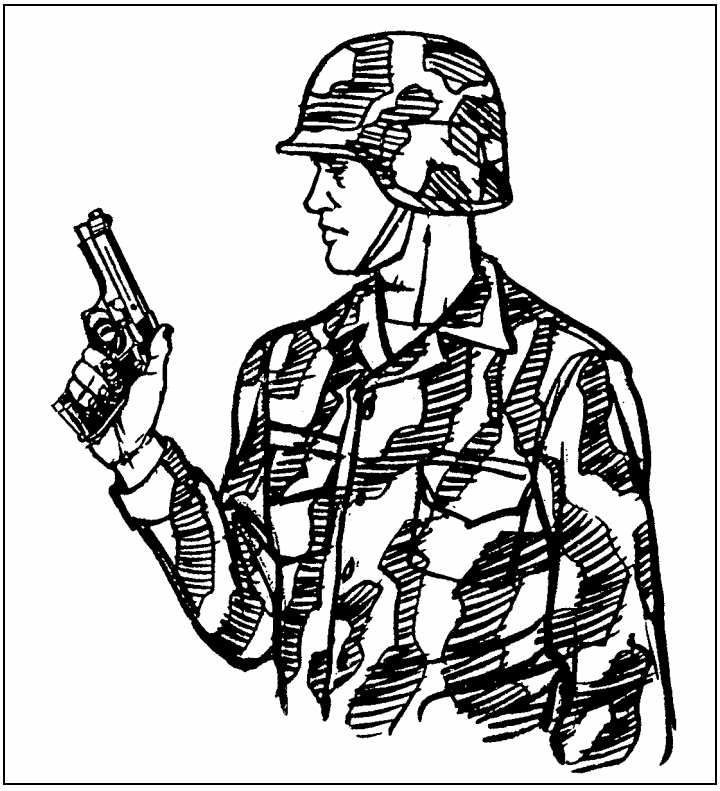

Figure 2-8. Pistol-ready position.

b. **Standing Position without Support**. Face the target (Figure 2-9). Place feet a comfortable distance apart, about shoulder width. Extend the firing arm and attain a two-hand grip. The wrist and elbow of the firing arm are locked and pointed toward target center. Keep the body straight with the shoulders slightly forward of the buttocks.

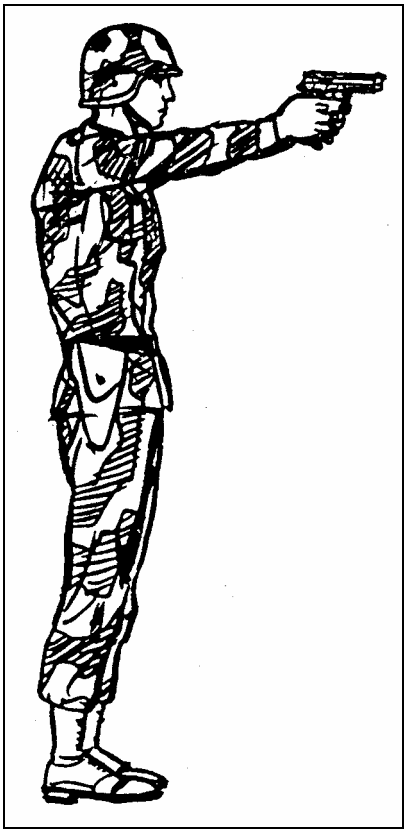

Figure 2-9. Standing position without support.

c. **Kneeling Position**. In the kneeling position, ground only your firing-side knee as the main support (Figure 2-10). Vertically place your firing-side foot, used as the main support, under your buttocks. Rest your body weight on the heel and toes. Rest your nonfiring arm just above the elbow on the knee not used as the main body support. Use the two-handed grip for firing. Extend the firing arm, and lock the firing-arm elbow and wrist to ensure solid arm control.

Figure 2-10. Kneeling position.

d. **Crouch Position**. Use the crouch position when surprise targets are engaged at close range (Figure 2-11). Place the body in a forward crouch (boxer's stance) with the knees bent slightly and trunk bent forward from the hips to give faster recovery from recoil. Place the feet naturally in a position that allows another step toward the target. Extend the weapon straight toward the target, and lock the wrist and elbow of the firing arm. It is important to consistently train with this position, since the body will automatically crouch under conditions of stress such as combat. It is also a faster position from which to change direction of fire.

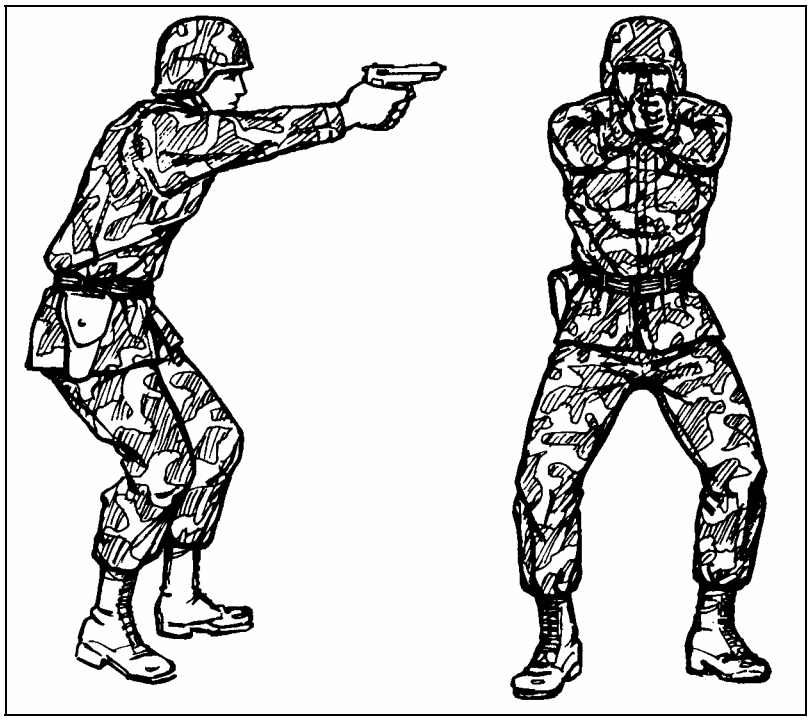

Figure 2-11. Crouch position.

e. **Prone Position**. Lie flat on the ground, facing the target (Figure 2-12). Extend your arms in front with the firing arm locked. (Your arms may have to be slightly unlocked for firing at high targets.) Rest the butt of the weapon on the ground for single, well-aimed shots. Wrap the fingers of the nonfiring hand around the fingers of the firing hand. Face forward. Keep your head down between your arms and behind the weapon as much as possible.

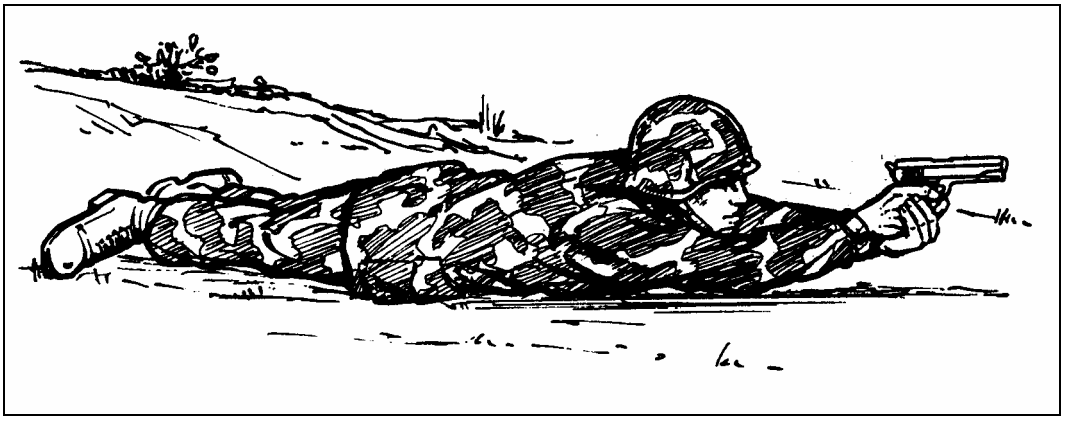

Figure 2-12. Prone position.

f. **Standing Position with Support**. Use available cover for support--for example, a tree or wall to stand behind (Figure 2-13). Stand behind a barricade with the firing side on line with the edge of the barricade. Place the knuckles of the nonfiring fist at eye level against the edge of the barricade. Lock the elbow and wrist of the firing arm. Move the foot on the nonfiring side forward until the toe of the boot touches the bottom of the barricade.

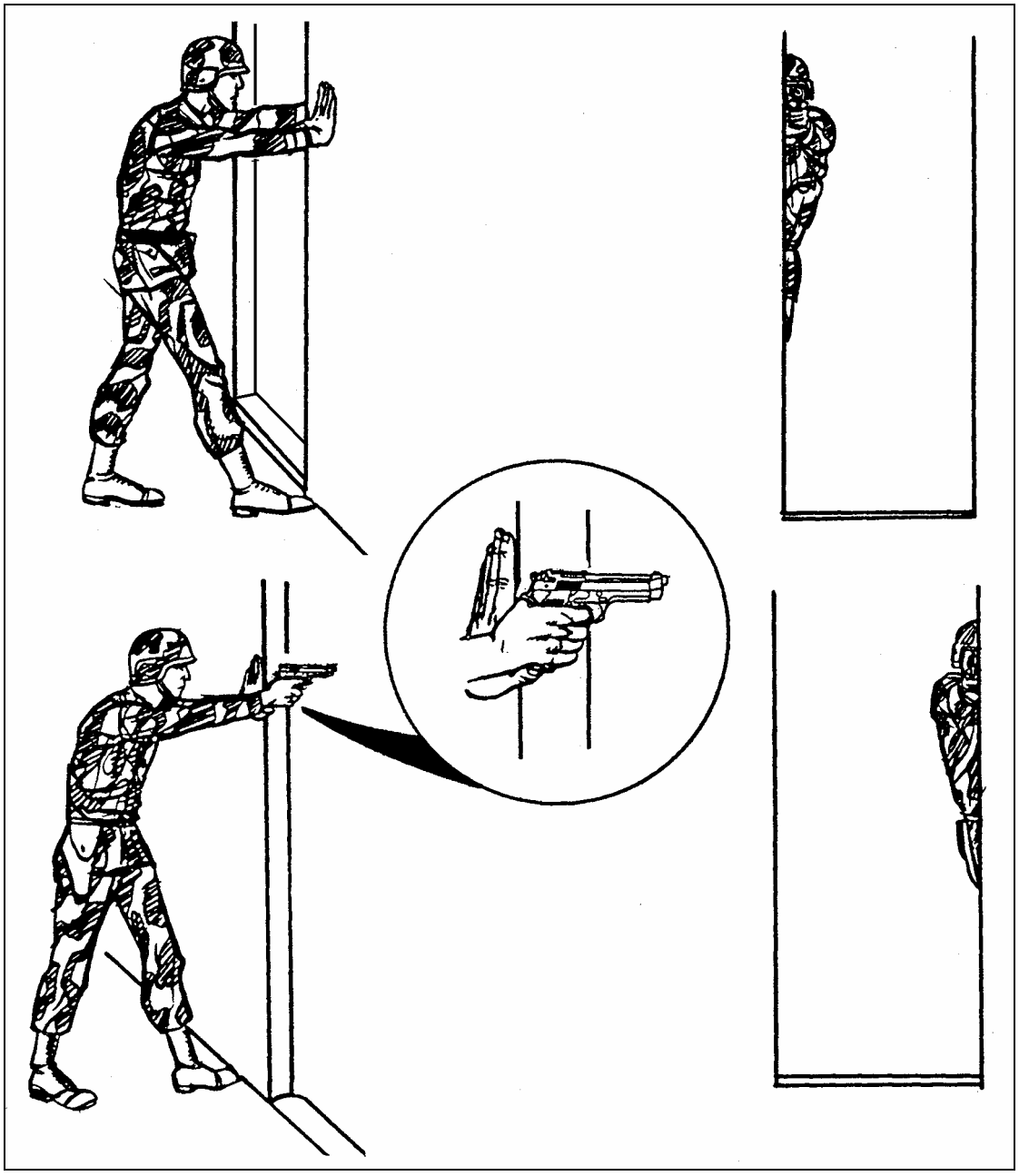

Figure 2-13. Standing position with support.

g. **Kneeling Supported Position**. Use available cover for support--for example, use a low wall, rocks, or vehicle (Figure 2-14). Place your firing-side knee on the ground. Bend the other knee and place the foot (nonfiring side) flat on the ground, pointing toward the target. Extend arms alongside and brace them against available cover. Lock the wrist and elbow of your firing arm. Place the nonfiring hand around the fist to support the firing arm. Rest the nonfiring arm just above the elbow on the nonfiring-side knee.

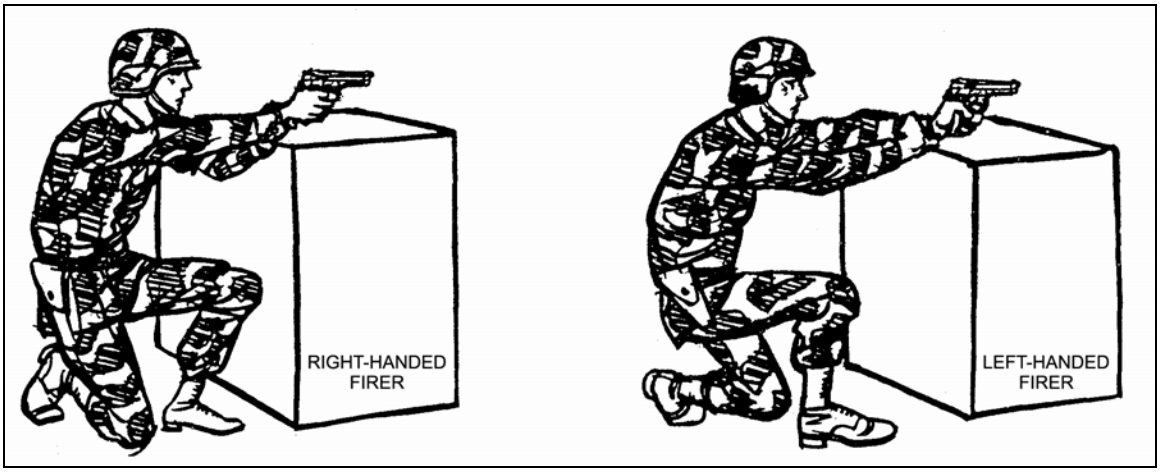

Figure 2-14. Kneeling supported.

Section II. COMBAT MARKSMANSHIP

After a soldier becomes proficient in the fundamentals of marksmanship, he progresses to advanced techniques of combat marksmanship. The main use of the pistol is to engage the enemy at close range with quick, accurate fire. In shooting encounters, it is not the first round fired that wins the engagement, but the first accurately fired round. The soldier should use his sights when engaging the enemy unless this would place the weapon within arm's reach of the enemy.

2-7. TECHNIQUES OF FIRING

Firing techniques include the use of hand-and-eye coordination, flash sight picture, quick-fire point shooting, and quick-fire sighting.

a. **Hand-and-Eye Coordination**. Hand-and-eye coordination is not a natural, instinctive ability for all soldiers. It is usually a learned skill obtained by practicing the use of a flash sight picture (see paragraph b below). The more a soldier practices raising the weapon to eye level and obtaining a flash sight picture, the more natural the relationship between soldier, sights, and target becomes. Eventually, proficiency elevates to a point so that the soldier can accurately engage targets in the dark. Each soldier must be aware of this trait and learn how to use it best. Poorly coordinated soldiers can achieve proficiency through close supervision from their trainers. Everyone has the ability to point at an object. Since pointing the forefinger at an object and extending the weapon toward a target are much the same, the combination of the two are natural. Making the soldier aware of this ability and teaching him how to apply it results in success when engaging enemy targets in combat.

(1) The eyes focus instinctively on the center of any object observed. After the object is sighted, the firer aligns his sights on the center of mass, focuses on the front sight, and applies proper trigger squeeze. Most crippling or killing hits result from maintaining the focus on the center of mass. The eyes must remain fixed on some part of the target throughout firing.

(2) When a soldier points, he instinctively points at the feature on the object on which his eyes are focused. An impulse from the brain causes the arm and hand to stop when the finger reaches the proper position. When the eyes are shifted to a new object or feature,

the finger, hand, and arm also shift to this point. It is this inherent trait that can be used by the soldier to engage targets rapidly and accurately. This instinct is called hand-and-eye coordination.

b. **Flash Sight Picture**. Usually, when engaging an enemy at pistol range, the firer has little time to ensure a correct sight picture. The quick-kill (or natural point of aim) method does not always ensure a first-round hit. A compromise between a correct sight picture and the quick-kill method is known as a flash sight picture. As the soldier raises the weapon to eye level, his point of focus switches from the enemy to the front sight, ensuring that the front and rear sights are in proper alignment left and right, but not necessarily up and down. Pressure is applied to the trigger as the front sight is being acquired, and the hammer falls as the flash sight picture is confirmed. Initially, this method should be practiced slowly, with speed gained as proficiency increases.

c. **Quick-Fire Point Shooting**. This is for engaging an enemy at less than 5 yards and is also useful for night firing. Using a two-hand grip, the firer brings the weapon up close to the body until it reaches chin level. He then thrusts it forward until both arms are straight. The arms and body form a triangle, which can be aimed as a unit. In thrusting the weapon forward, the firer can imagine that there is a box between him and the enemy, and he is thrusting the weapon into the box. The trigger is smoothly squeezed to the rear as the elbows straighten.

d. **Quick-Fire Sighting**. This technique is for engaging an enemy at 5 to 10 yards away and only when there is no time available to get a full picture. The firing position is the same as for quick-fire point shooting. The sights are aligned left and right to save time, but not up and down. The firer must determine in practice what the sight picture will look like and where the front sight must be aimed to hit the enemy in the chest.

2-8. TARGET ENGAGEMENT

In close combat, there is seldom time to precisely apply all of the fundamentals of marksmanship. When a soldier fires a round at the enemy, he often does not know if he hits his target. Therefore, two rounds should be fired at the target. This is called controlled pairs. If the enemy continues to attack, two more shots should be placed in the pelvic area to break the body's support structure, causing the enemy to fall.

2-9. TRAVERSING

In close combat, the enemy may be attacking from all sides. The soldier may not have time to constantly change his position to adapt to new situations. The purpose of the crouching or kneeling 360-degree traverse is to fire in any direction without moving the feet.

a. **Crouching 360-Degree Traverse**. The following instructions are for a right-handed firer. The two-hand grip is used at all times except for over the right shoulder. The firer remains in the crouch position with feet almost parallel to each other. Turning will be natural on the balls of the feet.

(1) ***Over the Left Shoulder*** (Figure 2-15): The upper body is turned to the left, the weapon points to the left rear with the elbows of both arms bent. The left elbow is naturally bent more than the right elbow.

(2) ***Traversing to the Left*** (Figure 2-16): The upper body turns to the right, and the right firing arm straightens out. The left arm is slightly bent.

(3) ***Traversing to the Front*** (Figure 2-17): The upper body turns to the front as the left arm straightens out. Both arms are straight forward.

(4) ***Traversing to the Right*** (Figure 2-18): The upper body turns to the right as both elbows bend. The right elbow is naturally bent more than the left.

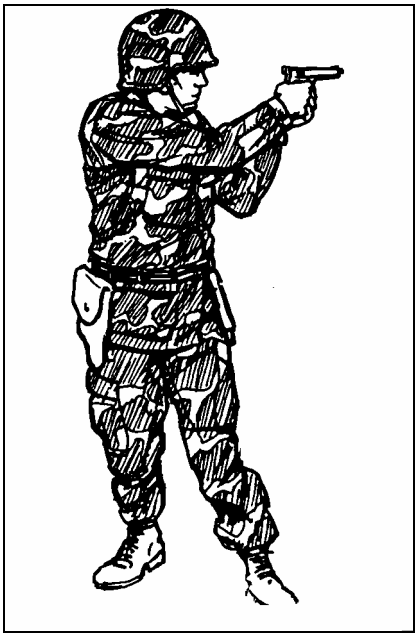

Figure 2-15. Traversing over the left shoulder.

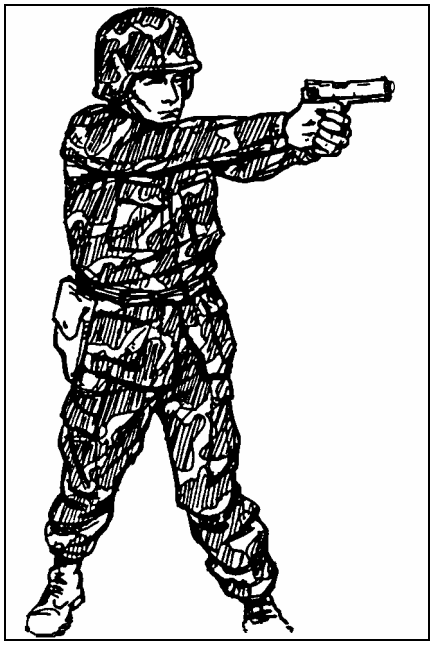

Figure 2-16. Traversing to the left.

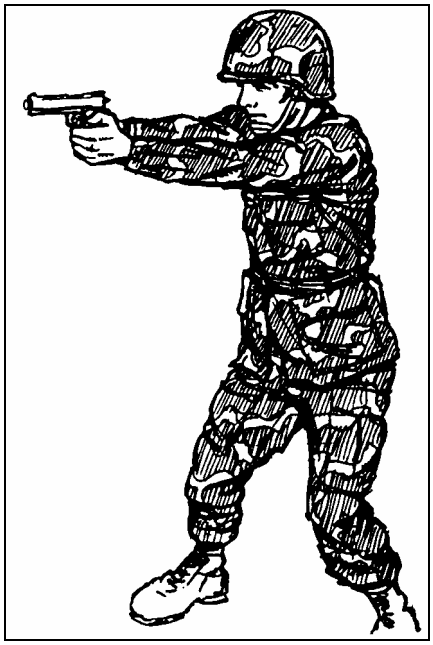

Figure 2-17. Traversing to the front.

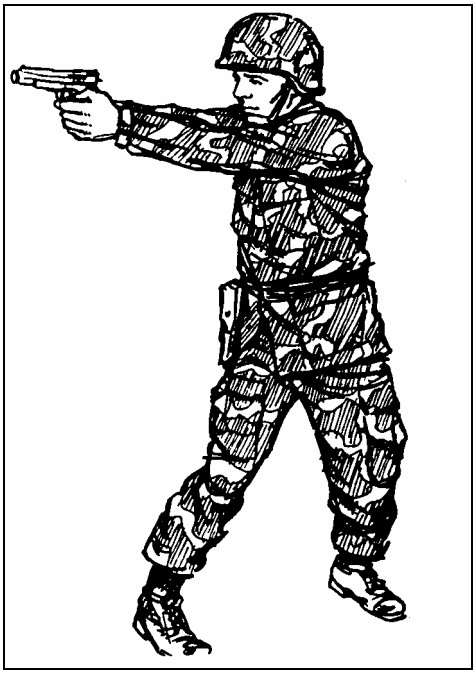

Figure 2-18. Traversing to the right.

(5) ***Traversing to the Right Rear*** (Figure 2-19): The upper body continues to turn to the right until it reaches a point where it cannot go further comfortably. Eventually the left hand must be released from the fist grip, and the firer will be shooting to the right rear with the right hand.

Figure 2-19. Traversing to the right rear.

b. **Kneeling 360-Degree Traverse**. The following instructions are for right-handed firers. The hands are in a two-hand grip at all times. The unsupported kneeling position is used. The rear foot must be positioned to the left of the front foot.

(1) ***Traversing to the Left Side*** (Figure 2-20): The upper body turns to a comfortable position toward the left. The weapon is aimed to the left. Both elbows are bent with the left elbow naturally bent more than the right elbow.

(2) ***Traversing to the Front*** (Figure 2-21): The upper body turns to the front, and a standard unsupported kneeling position is assumed. The right firing arm is straight, and the left elbow is slightly bent.

(3) ***Traversing to the Right Side*** (Figure 2-22): The upper body turns to the right as both arms straighten out.

(4) ***Traversing to the Rear*** (Figure 2-23): The upper body continues to turn to the right as the left knee is turned to the right and placed on the ground. The right knee is lifted off the ground and becomes the forward knee. The right arm is straight, while the left arm is bent. The direction of the kneeling position has been reversed.

Figure 2-20. Traversing to the left, kneeling.

Figure 2-21. Traversing to the front, kneeling.

Figure 2-22. Traversing to the right, kneeling.

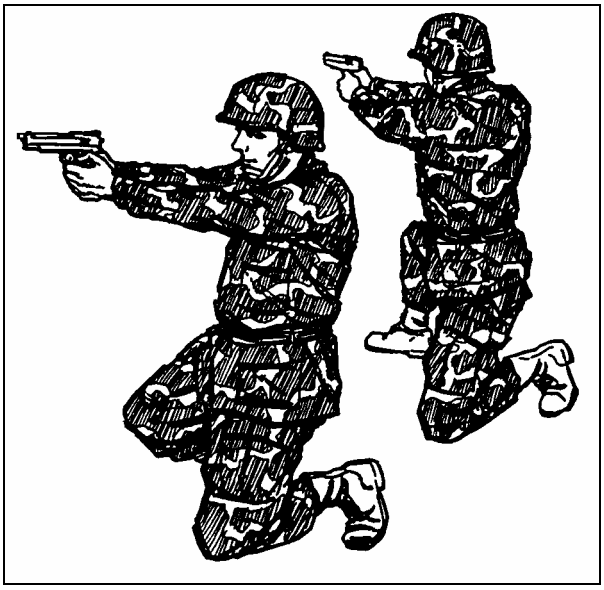

Figure 2-23. Traversing to the rear, kneeling.

(5) ***Traversing to the New Right Side*** (Figure 2-24): The upper body continues to the right. Both elbows are straight until the body reaches a point where it cannot go further comfortably. Eventually, the left hand must be released from the fist grip, and the firer is shooting to the right with the one-hand grip.

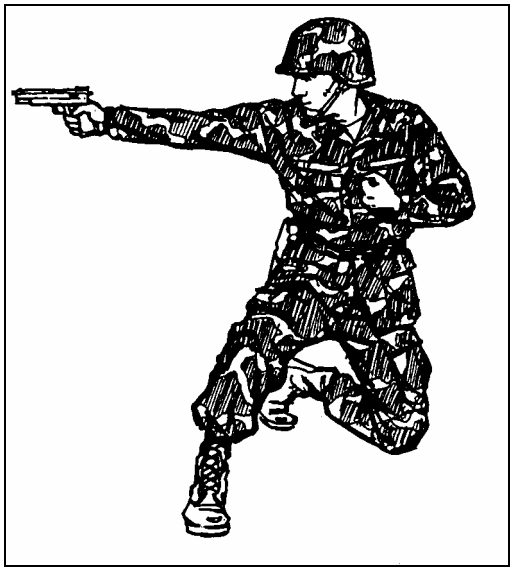

Figure 2-24. Traversing to the new right side, kneeling.

c. **Training Method**. This method can be trained and practiced anywhere and, with the firer simulating a two-hand grip, without a weapon. The firer should be familiar with firing in all five directions.

2-10. COMBAT RELOADING TECHNIQUES

Overlooked as a problem for many years, reloading has resulted in many casualties due to soldiers' hands shaking or errors such as dropped magazines, magazines placed in the pistol backwards, or empty magazines placed back into the weapon. The stress state induced by a life-threatening situation causes soldiers to do things they would not otherwise do. Consistent, repeated training is needed to avoid such mistakes.

NOTE: These procedures should be used only in combat, not on firing ranges.

a. Develop a consistent method for carrying magazines in the ammunition pouches. All magazines should face down with the bullets facing forward and to the center of the body.

b. Know when to reload. When possible, count the number of rounds fired. However, it is possible to lose count in close combat. If this happens, there is a distinct difference in recoil of the pistol when the last round has been fired. Change magazines when two rounds may be left--one in the magazine and one in the chamber. This prevents being caught with an empty weapon at a crucial time. Reloading is faster with a round in the chamber since time is not needed to release the slide.

c. Obtain a firm grip on the magazine. This precludes the magazine being dropped or difficulty in getting the magazine into the weapon. Ensure the knuckles of the hand are toward the body while gripping as much of the magazine as possible. Place the index finger high on the front of the magazine when withdrawing from the pouch. Use the index finger to guide the magazine into the magazine well.

d. Know which reloading procedure to use for the tactical situation. There are three systems of reloading: rapid, tactical, and one-handed. Rapid reloading is used when the

soldier's life is in immediate danger and the reload must be accomplished quickly. Tactical reloading is used when there is more time and it is desirable to keep the replaced magazine because there are rounds still in it or it will be needed again. One-handed reloading is used when there is an arm injury.

(1) ***Rapid Reloading***.

(a) Place your hand on the next magazine in the ammunition pouch to ensure there is another magazine.

(b) Withdraw the magazine from the pouch while releasing the other magazine from the weapon. Let the replaced magazine drop to the ground.

(c) Insert the replacement magazine, guiding it into the magazine well with the index finger.

(d) Release the slide, if necessary.

(e) Pick up the dropped magazine if time allows. Place it in your pocket, not back into the ammunition pouch where it may become mixed with full magazines.

(2) ***Tactical Reloading***.

(a) Place your hand on the next magazine in the ammunition pouch to ensure there is a remaining magazine.

(b) Withdraw the magazine from the pouch.

(c) Drop the used magazine into the palm of the nonfiring hand, which is the same hand holding the replacement magazine.

(d) Insert the replacement magazine, guiding it into the magazine well with the index finger.

(e) Release the slide, if necessary.

(f) Place the used magazine into a pocket. Do not mix it with full magazines.

(3) ***One-Hand Reloading, Right Hand***.

(a) Push the magazine release button with the thumb.

(b) Place the safety ON with the thumb if the slide is forward.

(c) Place the weapon backwards into the holster.

NOTE: If placing the weapon in the holster backwards is a problem, place the weapon between the calf and thigh to hold the weapon.

(d) Insert the replacement magazine.

(e) Withdraw the weapon from the holster.

(f) Remove the safety with the thumb if the slide is forward, or push the slide release if the slide is back.

(4) ***One-Hand Reloading, Left Hand***.

(a) Push the magazine release button with the middle finger.

(b) Place the weapon backwards into the holster.

NOTE: If placing the weapon in the holster backwards is a problem, place the weapon between the calf and thigh to hold the weapon.

(c) Insert the replacement magazine.

(d) Remove the weapon from the holster.

(e) Remove the safety with the thumb if the slide is forward, or push the slide release lever with the middle finger if the slide is back.

2-11. POOR VISIBILITY FIRING

Poor visibility firing with any weapon is difficult since shadows can be misleading to the soldier. This is mainly true during EENT and EMNT (a half hour before dark and a half hour before dawn). Even though the pistol is a short-range weapon, the hours of darkness and poor visibility further decrease its effect. To compensate, the soldier must use the three principles of night vision.

a. **Dark Adaptation**. This process conditions the eyes to see during poor visibility conditions. The eyes usually need about 30 minutes to become 98-percent adapted in a totally darkened area.

b. **Off-Center Vision**. When looking at an object in daylight, a person looks directly at it. However, at night he would see the object only for a few seconds. To see an object in darkness, he must concentrate on it while looking 6 to 10 degrees away from it.

c. **Scanning**. This is the short, abrupt, irregular movement of the firer's eyes around an object or area every 4 to 10 seconds. When artificial illumination is used, the firer uses night fire techniques to engage targets, since targets seem to shift without moving.

NOTE: For more detailed information on the three principles of night vision, see FM 21-75.

2-12. NUCLEAR, BIOLOGICAL, CHEMICAL FIRING

When firing a pistol under NBC conditions, the firer should use optical inserts, if applicable. Firing in MOPP levels 1 through 3 should not be a problem for the firer. Unlike wearing a protective mask while firing a rifle, the firer's sight picture will be acquired the same as without a protective mask. MOPP4 is the only level that may present a problem for a firer since gloves are worn. Gloves may require the firer to adjust his grip to attain a proper grip and proper trigger squeeze. Firers should practice firing in MOPP4 to become proficient in NBC firing.

Section III. COACHING AND TRAINING AIDS

Throughout preparatory marksmanship training, the coach-and-pupil method of training should be used. The proficiency of a pupil depends on how well his coach performs his duties. This section provides detailed information on coaching techniques and training aids for pistol marksmanship.

2-13. COACHING

The coach assists the firer by correcting errors, ensuring he takes proper firing positions, and ensuring he observes all safety precautions. The criteria for selecting coaches are a command responsibility; coaches must have experience in pistol marksmanship above that of the student firer. Duties of the coach during instruction practice and record firing include:

a. Checking that the--
- Weapon is cleared.
- Ammunition is clean.

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HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 30 August 2001

LIGHT ANTIARMOR WEAPONS

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By Order of the Secretary of the Army:

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CHAPTER 1
INTRODUCTION

This chapter provides information common to the light antiarmor weapons discussed in this manual. Topics include care and handling, destruction and decontamination procedures, and operating temperatures. Light antiarmor weapons are used against light armored vehicles, field fortifications, or other similar targets. These weapons are issued as rounds of ammunition to individual soldiers in addition to their assigned weapons and the unit's organic antiarmor weapons. Light antiarmor weapons can withstand extreme weather and environmental conditions, including arctic, tropical, and desert. The light antiarmor weapons category includes both light antiarmor and light antitank weapons.

1-1. TYPES OF LIGHT ANTIARMOR WEAPONS

Light antiarmor weapons include the M72-series light antitank weapon (LAW) and the M136 AT4. The M72-series LAW was designed in the early 1960's for use against light tanks of that era (Figure 1-1). The M136 AT4 was designed in the late 1980's for use against the improved armor of light armored vehicles (Figure 1-2).

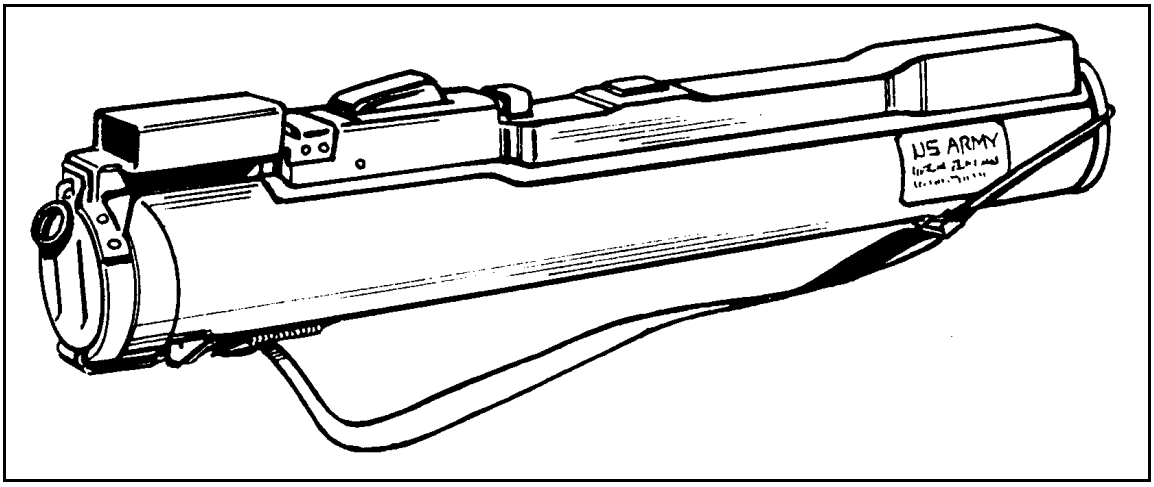


Figure 1-1. M72-series light antitank weapon.

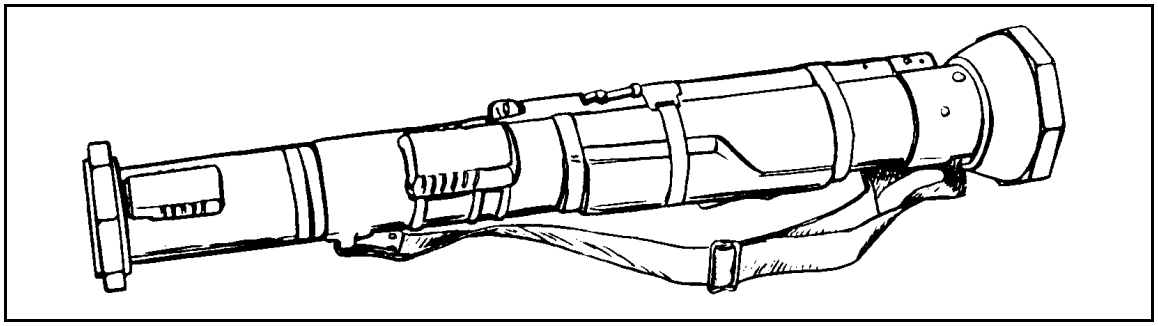


Figure 1-2. M136 AT4 light antiarmor weapon.

1-2. CARE AND HANDLING

Light antiarmor weapons are issued as rounds of ammunition. The only requirement for their care is a visual inspection, outlined in the appropriate chapter for each weapon (Chapter 2 for the LAW and Chapter 3 for the AT4).

1-3. DESTRUCTION PROCEDURES (COMBAT ONLY)

In combat, live and expended light antiarmor weapons are destroyed only to prevent their capture or use by the enemy and, even then, only on order. For such an order to be given, the weapons must be so badly damaged that neither repairs nor cannibalization can restore them to usable condition (FM 5-25). Table 1-1 provides destruction procedures for live and expended light antiarmor weapons; Appendix A discusses safety precautions to follow when destroying them.

DANGER

TO AVOID POSSIBLE INJURY OR DEATH, MOVE TO A SAFE POSITION AND TAKE COVER BEFORE USING ANY DESTRUCTION PROCEDURE. BEFORE USING DEMOLITIONS FOR ANY REASON, YOU MUST KNOW THE PROPER PROCEDURES IN FM 5-25.

LIVE LIGHT ANTIARMOR ROUND	**DEMOLITION**	Prepare a 113-gram (one-quarter pound) demolition charge. Tape or tie the charge over the propellant charge. Dual prime the charge to reduce the chance of a misfire.
	BURNING	Construct a pit or trench deep enough to allow 0.6 meter (2 feet) of space between the weapons and the top surface of the ground. Place combustible material such as wood, paper, or rags in the pit, then place the weapon inside, pointed into the side of the pit and directed away from all friendly soldiers. Pour diesel fuel or oil over the weapons and the combustible material.
	FIRING	If time does not permit use of the previous methods, dispose of the weapons by firing them randomly in the direction of the enemy. Before using this method, observe all appropriate safety requirements.

Table 1-1. Destruction procedures for light antiarmor weapons.

EXPENDED LIGHT ANTIARMOR ROUND	**MECHANICAL**	Though you must never use mechanical means to destroy live antiarmor weapons or expended M136 AT4s, you may do so to destroy the residue from an expended M72-series LAW. For example, you can drive over it with a tracked vehicle or strike it with a pick, ax, or other object, as long as you make it unusable.
	DEMOLITION	Same as a live round.
	BURNING	Same as a live round.

Table 1-1. Destruction procedures for light antiarmor weapons (continued).

DANGER

1. WHEN USING FIRE TO DESTROY A LIGHT ANTIARMOR WEAPON, THE TIME REQUIRED TO EXPLODE THE WARHEAD IS UNPREDICTABLE. ALSO, IGNITING THE PROPELLANT CAN CAUSE IT TO FIRE THE WARHEAD IN ANY DIRECTION, WHICH COULD IN TURN CAUSE INJURY OR DEATH.

2. OBSERVE THE APPROPRIATE SAFETY PRECAUTIONS WHEN HANDLING DIESEL FUEL. CARELESSNESS COULD CAUSE PAINFUL, EVEN FATAL, BURNS.

3. DO NOT TRY TO USE VEHICLES OR MECHANICAL MEANS TO DESTROY LIVE ANTIARMOR WEAPONS. EITHER METHOD COULD DETONATE THE WARHEAD OR PROPELLANT CHARGE, WHICH COULD CAUSE INJURY OR DEATH.

1-4. DECONTAMINATION PROCEDURES

The soldier can use his M258A1 or DKIE (XM280) individual decontamination packet to remove H-series, G-series, and V-series agents. FM 3-5 provides more information about decontamination procedures for equipment and weapons.

DANGER

NEVER USE DS2 TO DECONTAMINATE ANY LIGHT ANTIARMOR WEAPON. THE DS2 WOULD DISSOLVE THE RUBBER AND PLASTIC SEALS, ALLOWING THE DS2 TO REACH THE PROPELLANT AND PRODUCING AN EXTREMELY HAZARDOUS MIXTURE.

1-5. OPERATING TEMPERATURES

Operating temperatures for the M72-series LAW and M136 AT4 are -40 degrees to 140 degrees Fahrenheit (-40 degrees to 60 degrees Centigrade). Firing light antiarmor weapons in temperatures outside these limits could cause a misfire or produce some other hazard for the soldier (Appendix A).

CHAPTER 2

M72-SERIES LAW, OPERATION AND FUNCTION

This chapter provides information on and technical data for the M72-series light antitank weapon (LAW). It also discusses the characteristics, nomenclature, functioning, and operation of the LAW.

2-1. DESCRIPTION

The M72-series LAW is a lightweight, self-contained, antiarmor weapon consisting of a rocket packed in a launcher (Figure 2-1). It is man-portable, may be fired from either shoulder, and is issued as a round of ammunition. It requires little from the user—only a visual inspection and some operator maintenance. The launcher, which consists of two tubes, one inside the other, serves as a watertight packing container for the rocket and houses a percussion-type firing mechanism that activates the rocket.

a. **Outer Tube**. The trigger housing assembly (which contains the trigger assembly) is on the upper surface of the outer tube. So are the trigger arming handle, front and rear sight assemblies, and the launcher's rear cover.

b. **Inner Tube**. The inner tube telescopes outward toward the rear, guided by a channel assembly that rides in an alignment slot in the outer tube's trigger housing assembly. The channel assembly also houses the firing pin rod assembly, which includes a detent lever assembly. The detent lever assembly moves under the trigger assembly in the outer tube, locking the inner tube in the extended position and cocking the weapon. All this must occur before the weapon can be fired.

c. **Rocket**. The rocket is a percussion-ignited, fin-stabilized, fixed munition. The rocket is attached by the igniter to the inside of the launcher. The rocket consists of a 66-mm HEAT warhead, a point-initiating, base-detonating fuze, and a rocket motor. Six spring-loaded fins are attached to the rear of the rocket motor. These fins are folded forward along the motor when the rocket is in the launcher. When ignited, the propellant in the rocket motor burns completely, producing gasses about 1,400 degrees Fahrenheit (760 degrees Centigrade). The gas pressure pushes the rocket toward the target and exits to the rear of the launcher as the backblast.

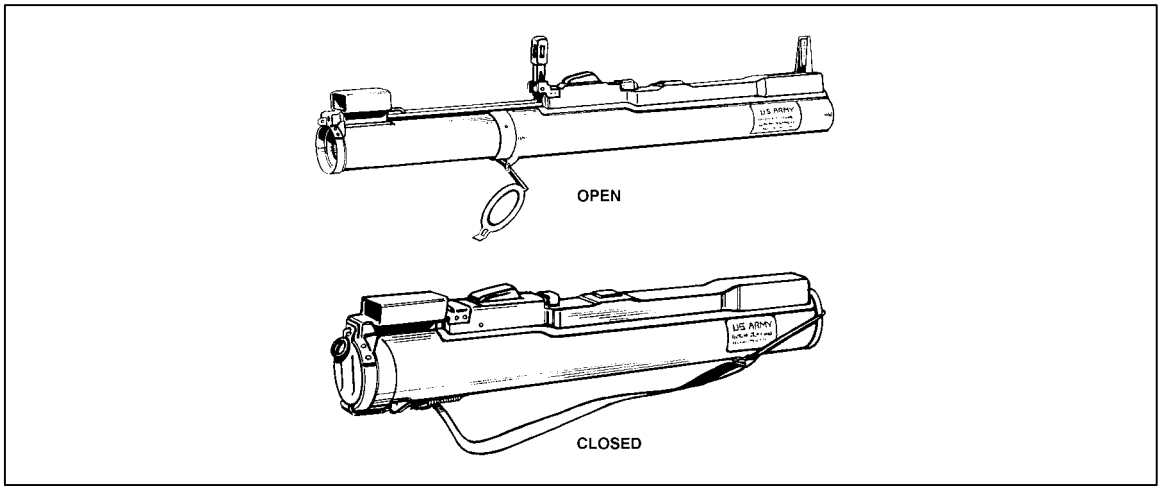


Figure 2-1. The M72A2 or M72A3 LAW.

2-2. TECHNICAL DATA

The following data apply to the M72A2 and M72A3 LAWs:

a. **Launcher**.

Length (Extended)	Less than 1 meter (34.67 inches)
Length (Closed)	0.67 meter (24.8 inches)
Weight (Complete M72A2)	2.3 kg (5.1 pounds)
Weight (Complete M72A3)	2.5 kg (5.5 pounds)
Firing Mechanism	Percussion
Front Sight	Reticle graduated in 25-meter range increments
Rear Sight	Peep sight adjusts automatically to temperature change

b. **Rocket**.

Caliber	66 mm
Length	50.8 cm (20 inches)
Weight	1.8 kg (2.2 pounds)
Muzzle Velocity	144.8 mps (475 fps)
Minimum Range (Combat)	10 meters (33 feet)
Minimum Arming Range	10 meters (33 feet)
Maximum Range	1,000 meters (3,300 feet)
Maximum Effective Ranges:	
Stationary Target	200 meters (660 feet)
Moving Target	165 meters (541 feet)

(Beyond these ranges, there is less than a fifty percent chance of hitting the target.)

2-3. AMMUNITION

The M72-series LAW is issued as a round of ammunition. It contains a nonadjustable propelling charge and a rocket. Every M72-series LAW has an integral high-explosive antitank (HEAT) warhead. The warhead is in the rocket's head (or body) section. The fuze and booster are in the rocket's closure section. The propellant, its igniter, and the fin assembly are in the rocket's motor. No inert versions are available (Figure 2-2). Appendix B provides information about appropriate gunnery training devices and ammunition. Although the M72-series LAW is mainly used as an antiarmor weapon, it may be used with limited success against secondary targets such as gun emplacements, pillboxes, buildings, or light vehicles. (Chapter 6 provides more information about combat techniques.)

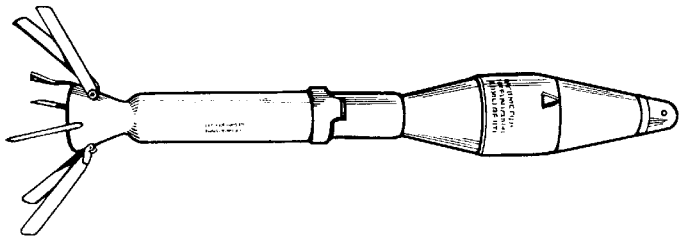


Figure 2-2. High-explosive antitank rocket (ammunition).

a. **Description**. The 66-mm HEAT rocket warhead consists of a tapered, thin-gauge steel body. When it explodes, the force and heat of the explosive focus into a small but powerful gas jet. This directional jet penetrates the target and, if the target is a vehicle, sprays molten metal inside. If the jet hits an engine or ammunition, it may start a fire or cause an explosion. Figure 2-3 shows how the warhead penetrates 300 millimeters of rolled homogeneous steel armor.

(1) ***Impact***. The nose cone crushes; the impact sensor activates the fuze.

(2) ***Ignition***. The ogive crush switch activates the electric detonator. The booster detonates, initiating the main charge.

(3) ***Penetration***. The main charge fires and forces the warhead body liner into a directional gas jet that penetrates armor plate.

(4) ***After Armor Effects (Spalling)***. The projectile fragments and incendiary effects produce blinding light and destroy the target's interior.

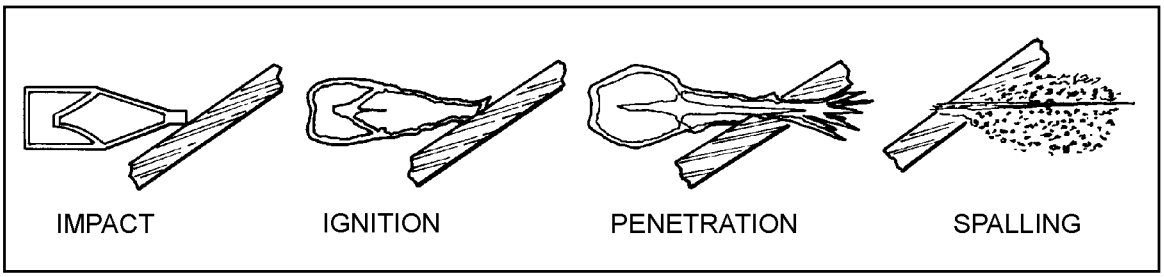
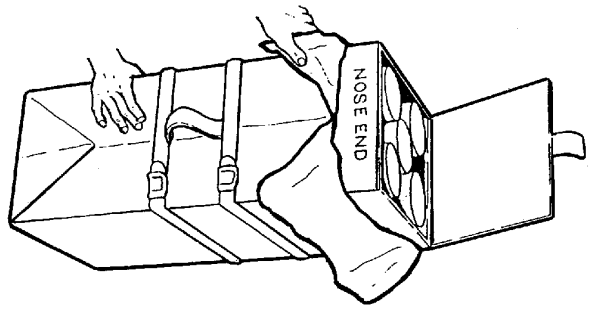


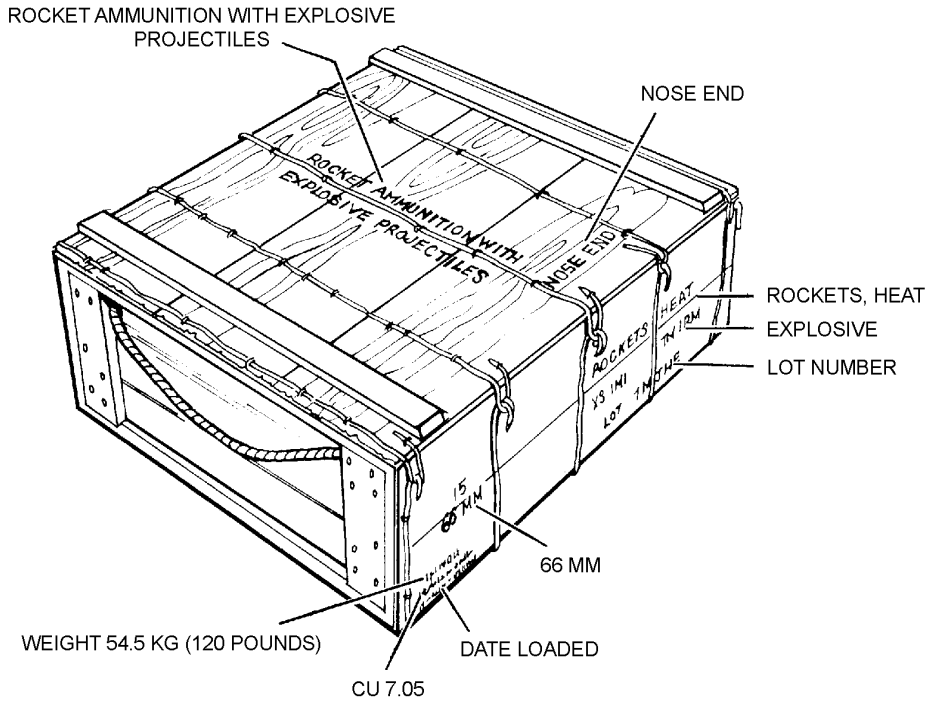
Figure 2-3. Effects of M72-series LAW warhead.

b. **Characteristics**. The head of the round is olive drab stenciled in yellow. The M412 fuze is dropsafe and boresafe. Its minimum arming distance is about 33 feet (10 meters). Six stabilizing fins are attached as part of the motor. As the rocket clears the launcher, springs force open the fins, which stabilize the rocket in flight.

c. **Packaging**. Five complete M72-series LAWs are packaged within a fiberboard inner pack for a total weight of 12.5 kilograms (27 1/2 pounds). Three inner packs are then placed in a wire-bound wooden box, the gross weight of which is 54.5 kilograms (120 pounds) (Figure 2-4, page 2-4).



CUTAWAY VIEW OF INNER PACK



OUTER BOX MARKINGS

Figure 2-4. Packaging for M72-series LAW.

2-4. INSPECTION

Because the M72-series LAW is issued as a round of ammunition rather than as a weapon, inspection is limited to a visual examination of the sealed unit.

Inspect the launcher's overall condition before preparing the launcher for use.

- Check the body for dents, cracks, or bulges.
- Check the rubber boots covering the trigger bar and barrel detent for tears or punctures.
- Ensure the arming handle is present and on SAFE and that the pull pin is in place.

- Check the data plate for the phrase, W/COUPLER (Figure 2-5).

DANGER

1. IF THE M72A2 LAW DOES NOT STATE "W/COUPLER" ON ITS DATA PLATE, TURN THE WEAPON IN TO THE UNIT AMMUNITION SECTION.

2. THE COUPLER PREVENTS THE INNER AND OUTER TUBES FROM SEPARATING AND POSSIBLY CAUSING PREMATURE DETONATION.

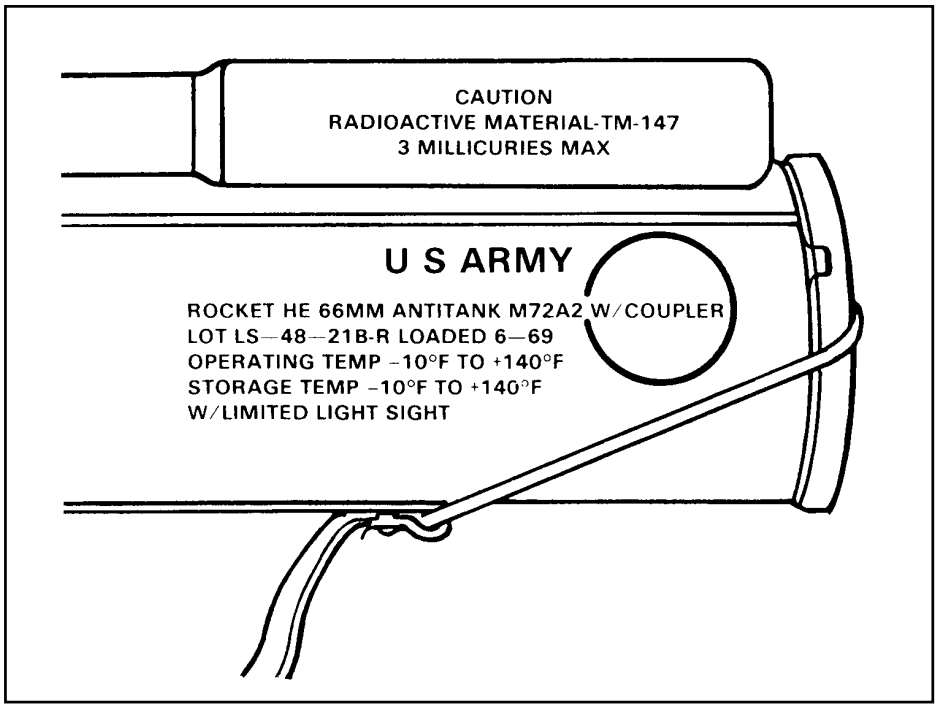


Figure 2-5. Launcher data plate.

2-5. FIRING MECHANISM

The firing mechanism includes the trigger arming handle, the trigger assembly, and the firing pin rod assembly (Figure 2-6).

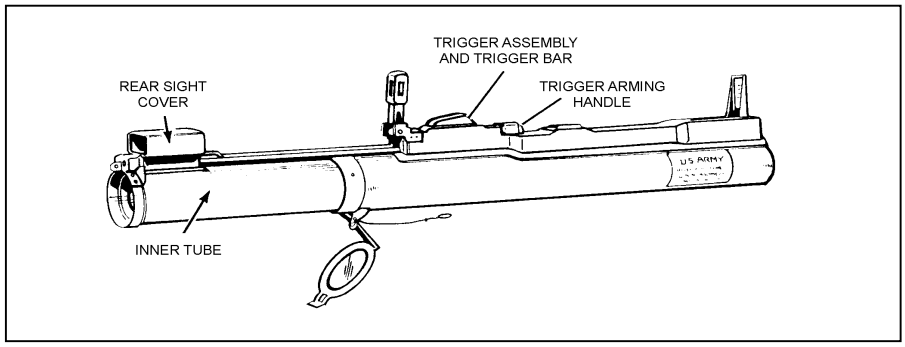


Figure 2-6. Firing mechanism.

a. **Trigger Arming Handle**. The trigger arming handle is located forward of the trigger bar and has two positions: SAFE and ARM. Leave the trigger arming handle on SAFE until the launcher is in the correct firing position (Figure 2-7). To press the trigger, you must first pull the arming handle forward and lock it in the ARM position.

b. **Trigger Assembly**. The trigger assembly is on the top rear of the outer tube. To fire the launcher, press downward on the trigger bar.

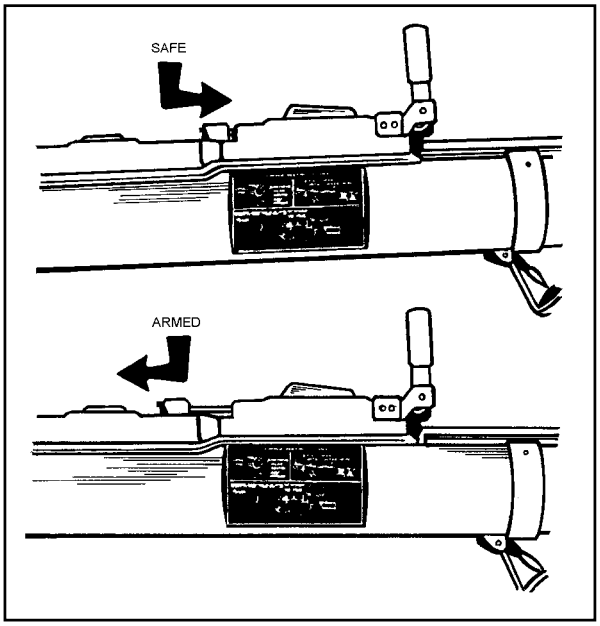


Figure 2-7. Trigger arming handle.

c. **Firing Pin Rod Assembly**. The rear sight cover and the firing pin housing are on the top of the rear of the inner tube. Inside the housing, the primer and the firing pin rod are aligned (Figure 2-8). Pressing the trigger bar releases the tension on the firing pin rod assembly, allowing the firing pin to strike the center of the primer.

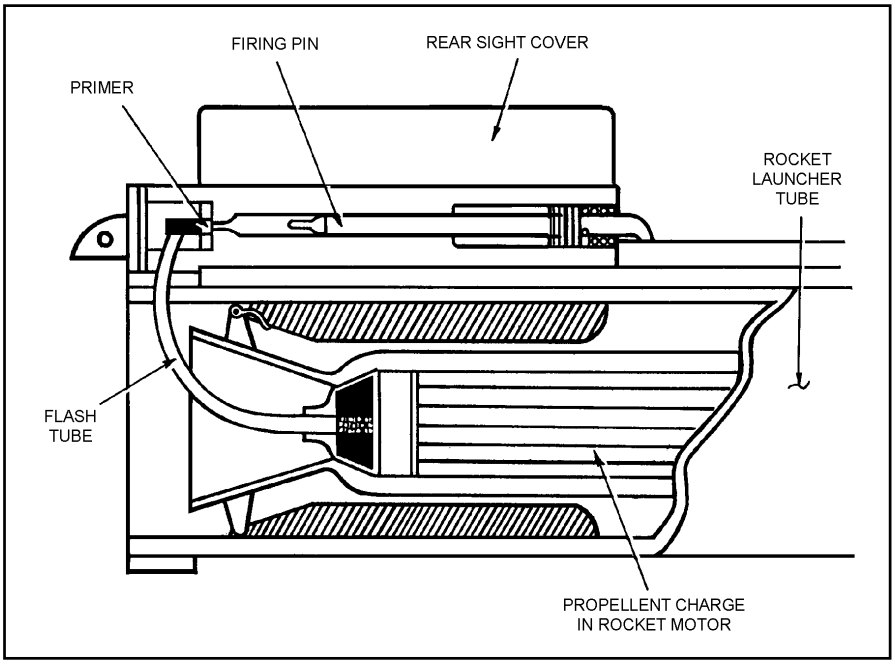


Figure 2-8. Firing pin, primer, and propellant charge.

2-6. SIGHTS

This paragraph discusses the front and rear sights and their proper use.

a. **Front Sight, M72A2 and M72A3 LAWs**. The front sight has a raised vertical range line marked with ranges from 50 to 350 meters in 25-meter increments (Figure 2-9). Two curved stadia lines are etched on the front sights. Do not use the stadia lines on this sight to estimate range, because they are inaccurate. Lead indicators are located on either side of the stadia lines to help you engage moving targets. On the M72A3, use the front sight illuminated range marks at the 100-meter and 150-meter points to help you engage targets in low light.

WARNING

DO NOT TOUCH THE RANGE MARKS; THEY ARE ILLUMINATED WITH PROMETHIUM, WHICH IS MILDLY RADIOACTIVE.

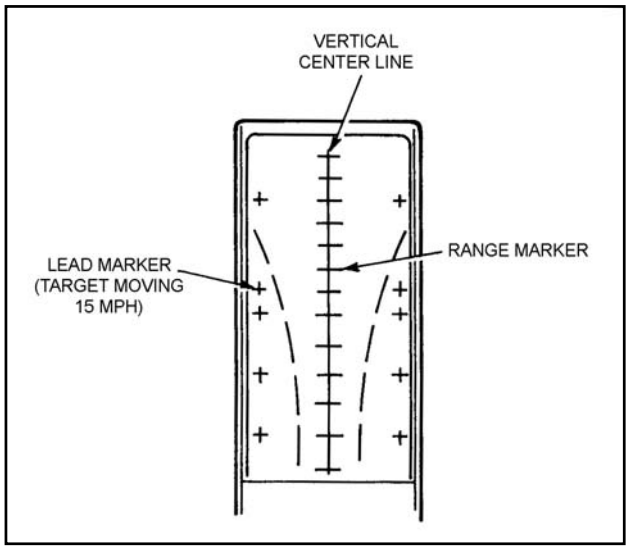


Figure 2-9. Front sight, M72A2 and M72A3 LAWs.

b. **Rear Sight, M72A2 and M72A3 LAWs**. The rear sight consists of a steel bracket with a rubber boot and plastic peep sight. This sight automatically adjusts to changes in temperature (Figure 2-10), which means that its settings are unaffected by temperature.

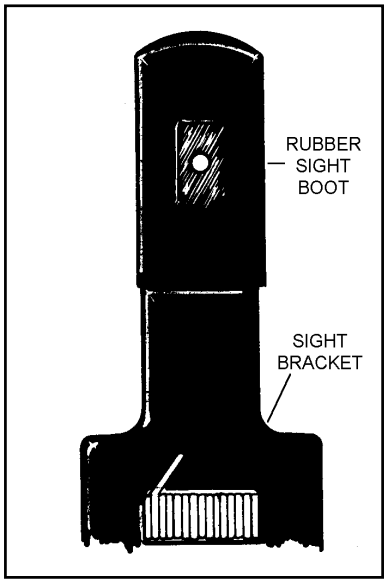


Figure 2-10. Rear sight, M72A2 and M72A3 LAWs.

c. **AN/PVS-4 Nightsight**. This nightsight is issued with various accessories, including a bracket that, when mounted on an M72-series LAW, will allow you to use an AN/PVS-4 on the LAW. However, this works only if DS maintenance has already installed an M72A1 reticle in the AN/PVS-4. Though the reticle was developed for the M72A1 LAW, you can also use it with the other M72-series models. To mount the M72A1 bracket assembly on any M72-series LAWC

(1) Place the bracket assembly on top of the rocket launcher (Figure 2-11) so that the square cutout in the top of the bracket fits over the extension release button.

(2) Swing the lower adapter section up and under the rocket launcher and secure it by turning the locking latch clockwise to fully engage the latch shoulder screw.

(3) Place the sight in the groove on the bracket and align the threaded screw hole in the base of the sight with the lever screw assembly. Tighten the lever screw assembly firmly.

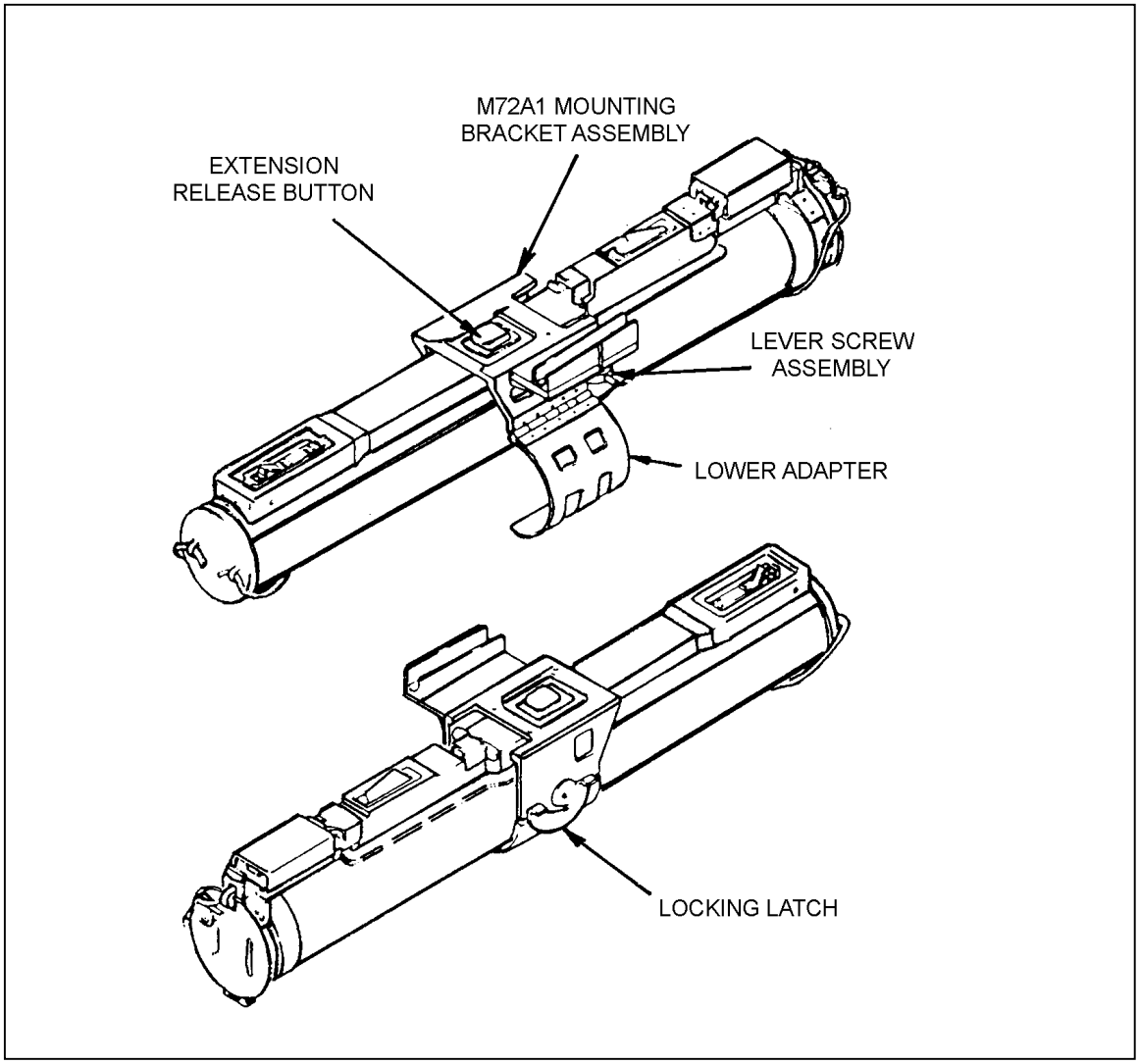


Figure 2-11. Installing M72A1 mounting bracket assembly.

(4) Use the M72A1 reticle to estimate the range to a 20-foot target such as a tank viewed from the side (Figure 2-12). Place the sight so that the rear and front of a flanking target fit between the curved vertical lines (Figure 2-13). When you read the range from the scale, note that the width of the tank is about one-half the tank's length. This means you can estimate the range to a target, whether it is headed straight toward you or straight away from you, by placing its sides between the curved vertical lines and halving the range shown at that point. The bottom of each vertical line in the center of the reticle

corresponds to an additional 25 meters. The length of a horizontal line represents 5 mils, and the spaces between lines represent 5 mils. Use the stadia lines to estimate range *only* when using the AN/PVS-4's M72A1 reticle pattern.

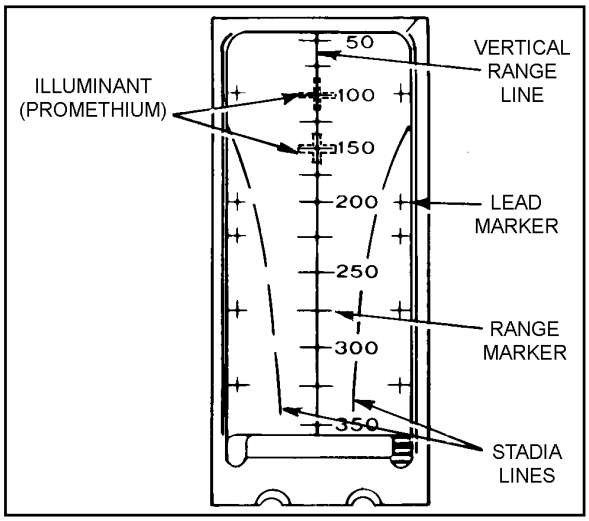


Figure 2-12. M72A1 reticle.

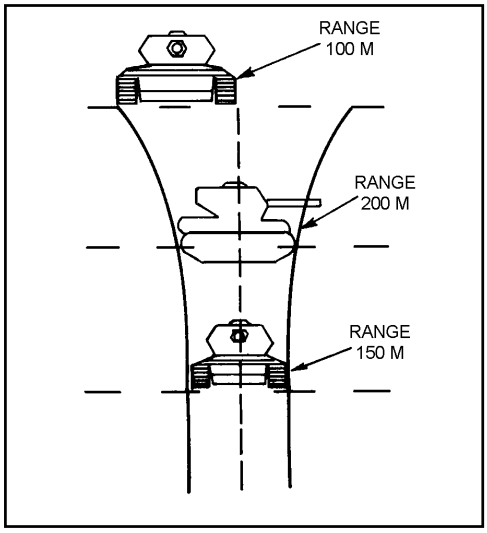


Figure 2-13. Using M72A1 stadia lines to engage targets.

(5) Align the nightsight's reticle pattern to the LAW sights only once. After that, you can move the nightsight from LAW to LAW without having to realign it each time (Figure 2-14). To align the sight reticle pattern to the LAW sights, place a target at 25 meters. Install the mounting bracket and sight, and select a stable firing position for the LAW. Turn both the TUBE BRIGHTNESS and RETICLE BRIGHTNESS knobs ON. Align the 200-meter range mark on the daysight with the aiming point on the target. Without moving the LAW, adjust the nightsight reticle so that its 200-meter range mark coincides with an aiming point 6.3 centimeters left and 3.5 centimeters above the target aiming point.

DANGER

IF YOU CANNOT FIND AN EMPTY LAUNCHER TO USE TO ALIGN THE NIGHTSIGHT, YOU MAY USE AN UNFIRED LAUNCHER, BUT THIS IS EXTREMELY DANGEROUS.

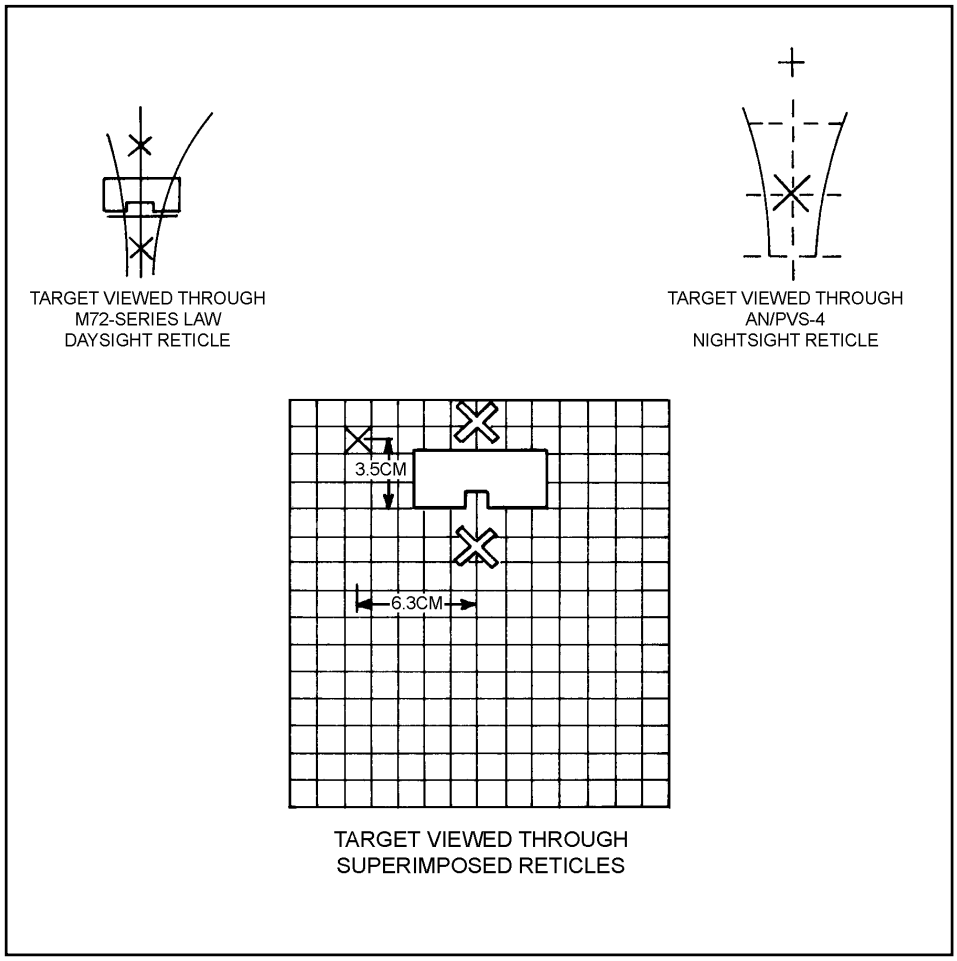


Figure 2-14. M72A1 alignment target for the AN/PVS-4.

2-7. OPERATION AND FUNCTION

Before preparing the launcher for use, the firer inspects its overall condition.

a. To extend the rocket launcher—

(1) Remove the pull pin and rotate the rear cover downward so the front cover and adjustable sling assembly can fall free (Figures 2-15 and 2-16, page 2-11). Do not discard the sling assembly until after you fire the rocket.

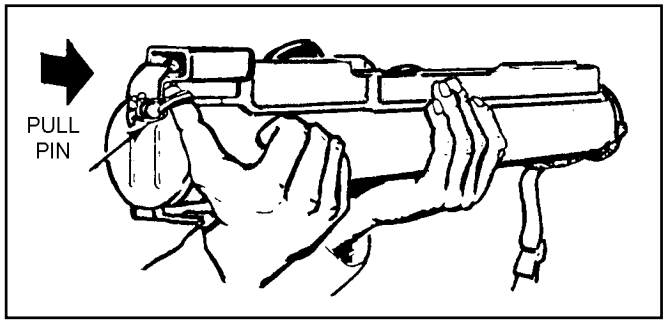


Figure 2-15. Removing the pull pin.

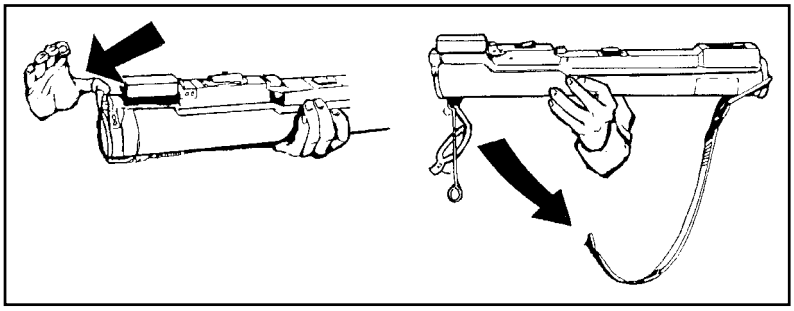


Figure 2-16. Removing the front cover and the adjustable sling assembly.

(2) With your firing hand, grasp the rear sight cover; with your nonfiring hand, grasp the launcher forward of the barrel detent. Pull your hands sharply in opposite directions to extend the launcher (Figure 2-17). To ensure the launcher is fully extended and locked, try to close it (Figure 2-18).

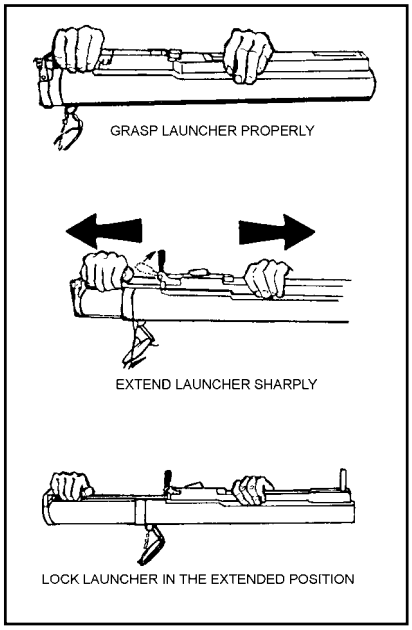


Figure 2-17. Extending the launcher.

b. To fire the rocket launcher, raise it slightly above shoulder level, rotate your body under it, and place it on your shoulder. Check the backblast area, pull the trigger arming handle to the ARM position, aim the launcher, and depress the rubber boot on the trigger bar firmly to ensure the launcher fires (Figure 2-19). (If the trigger arming handle will not remain in the ARM position, the launcher is not fully extended.) Pressing the trigger bar causes the firing pin to strike the primer, which ignites the black powder in the flash tube, which in turn ignites the propellant in the rocket motor.

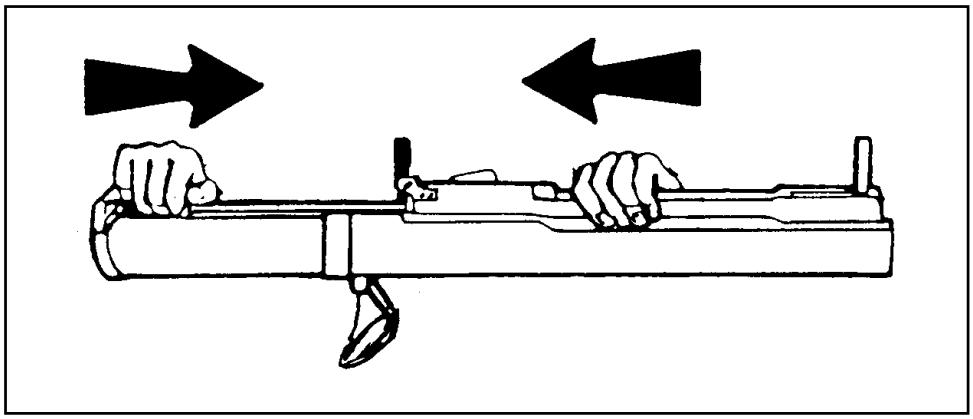


Figure 2-18. Ensuring launcher is locked in the extended position.

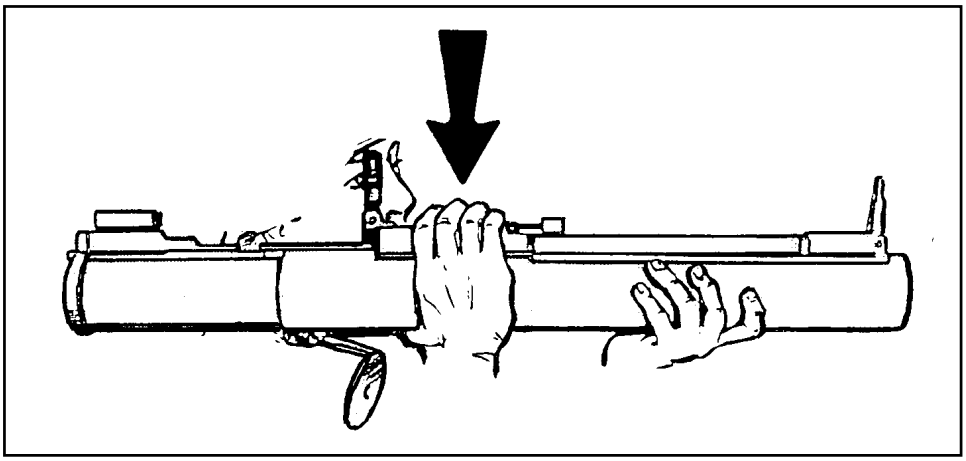


Figure 2-19. Firing the launcher.

DANGER

WHEN OPERATING THE LAW, KEEP IT POINTED DOWNRANGE. ENSURE YOUR WHOLE BODY IS CLEAR OF THE MUZZLE AND REAR OF THE LAUNCHER, AND ENSURE THE BACKBLAST AREA IS CLEAR.

2-8. MISFIRE PROCEDURES

A misfire is a complete failure to fire caused by a procedural or mechanical failure. Which misfire procedures should be used depends on whether the firer is in a combat or training environment.

a. **Causes**. A misfire is usually caused by one of the following factors:

- The launcher may not be fully extended.

- The trigger arming handle may not be armed.
- The firing mechanism or the propelling charge explosive train may be faulty.

WARNING
KEEP YOUR WEAPON POINTED TOWARD THE TARGET.

b. **Combat Environment**. If a misfire occurs in combat—

(1) Squeeze the trigger again immediately.

(2) If the launcher still fails to fire, place the trigger arming handle on SAFE.

(3) Partly collapse the launcher, then extend it to cock it again.

(4) Place it on your shoulder, check the backblast area again, then arm, aim, and fire.

(5) If the LAW still fails to fire, squeeze the trigger again and return the trigger arming handle to SAFE. Collapse the launcher, set it aside, and try another one. As soon as you can, dispose of the misfired LAW in accordance with SOP.

c. **Training Environment**. If an M72A2, M72A3, or M190 subcaliber device misfires on a live-fire training range—

(1) Squeeze the trigger again.

(2) If the launcher still fails to fire, keep the launcher on your shoulder, announce "Misfire," and wait 10 seconds. Place the trigger arming handle on SAFE.

(3) Move the launcher from your shoulder and wait one minute.

(4) Extend the launcher to cock it again, check the backblast area, place the launcher back on your shoulder, pull the arming handle to the ARM position, aim, and squeeze the trigger bar.

(5) If the launcher again fails to fire, wait 10 seconds before returning the trigger arming handle to the SAFE position.

(6) Keep the launcher trained on the target area at least one minute; DO NOT collapse the launcher.

(7) Move the launcher to a safe area and dispose of it IAW unit SOP.

2-9. RESTORATION TO CARRYING CONFIGURATION

If the launcher is prepared to fire, but then is not fired, it should be returned to the carrying configuration by reversing the preparation procedure. After the launcher has been prepared for firing, it is no longer watertight. Therefore, when carrying the launcher, sling it over either shoulder with the muzzle (forward) end down. Only the rocket and rocket motor ignition system are waterproof.

a. Return the trigger arming handle to the SAFE position.

b. Remove the launcher from your shoulder, depress the barrel detent, collapse the launcher tube, and guide the front and rear sights into position.

c. Close the rear cover, replace the cover pull pin, and replace the sling assembly.

WARNING
TO PREVENT INJURY, REMOVE YOUR THUMB FROM THE DETENT AFTER COLLAPSING THE LAUNCHER 1/2 TO 1 INCH.

CHAPTER 3

M136 AT4, OPERATION AND FUNCTION

This chapter provides information and technical data for the M136 AT4 light antiarmor weapon, including its characteristics, nomenclature, and operation. Its function, firing mechanism, and safeties are also discussed.

3-1. DESCRIPTION

The M136 AT4 is a lightweight, self-contained, antiarmor weapon. It consists of a free-flight, fin-stabilized, rocket-type cartridge packed in an expendable, one-piece, fiberglass-wrapped tube (Figure 3-1). The M136 AT4 is man-portable and is fired from the right shoulder only. The launcher is watertight for ease of transportation and storage. Though the M136 AT4 can be employed in limited visibility, the firer must be able to see and identify the target and estimate the range to it. Unlike the M72-series LAW, the M136 AT4 launcher need not be extended before firing.

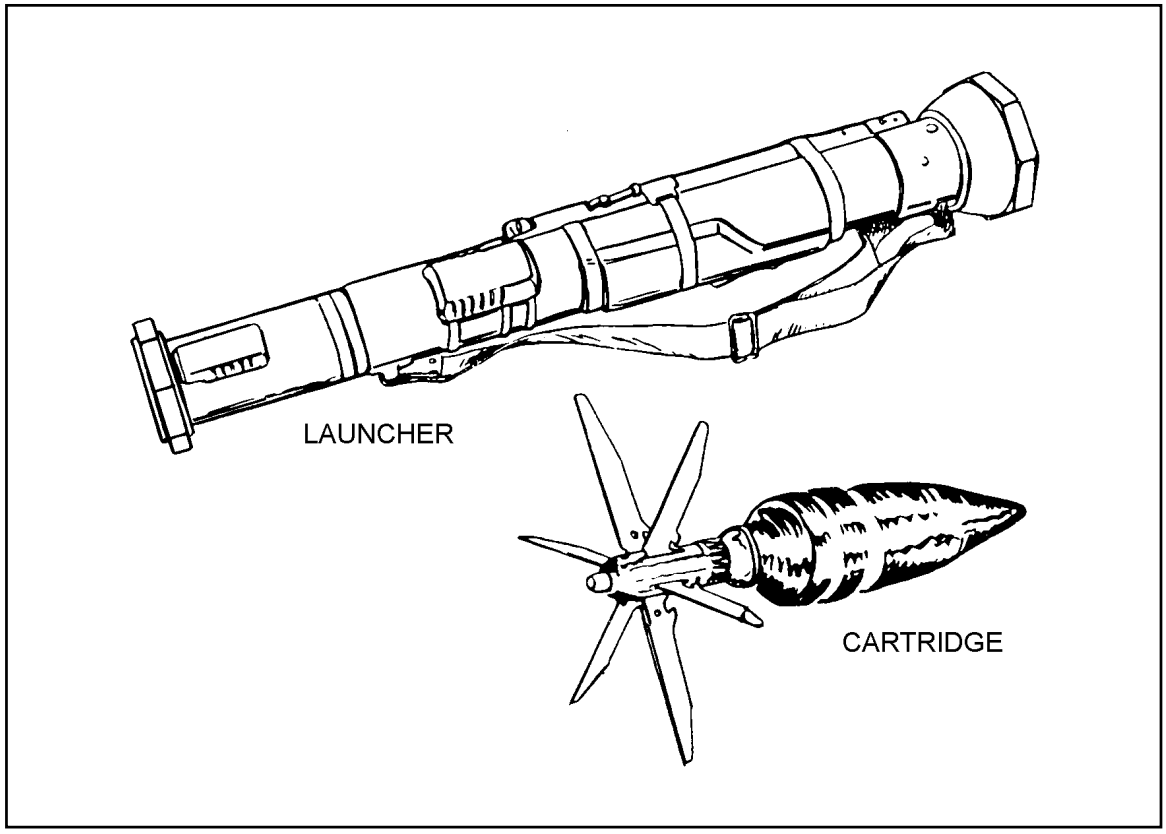


Figure 3-1. Launcher and HEAT cartridge.

3-2. TECHNICAL DATA

The following data apply to the M136 AT4:

a. **Launcher**.

Length	1,020 mm (40 inches)
Weight (Complete System)	6.7 kg (14.8 pounds)
Rear Sight	Range indicator, graduated in 50-meter increments

b. **Rocket**.

Caliber	84 mm
Muzzle Velocity	290 mps (950 fps)
Length	460 mm (18 inches)
Weight	1.8 kg (4 pounds)
Minimum Range	
Training	30 meters (100 feet)
Combat	10 meters (33 feet)
Arming	10 meters (33 feet)
Maximum Range	2,100 meters (6,890 feet)
Maximum Effective Range	300 meters (985 feet)

3-3. AMMUNITION

The M136 AT4 is a round of ammunition with an integral, rocket-type cartridge. The cartridge consists of a fin assembly with tracer element; a point-initiating, base-detonating, piezoelectric fuze; a warhead body with liner; and a precision-shaped explosive charge (Figure 3-2).

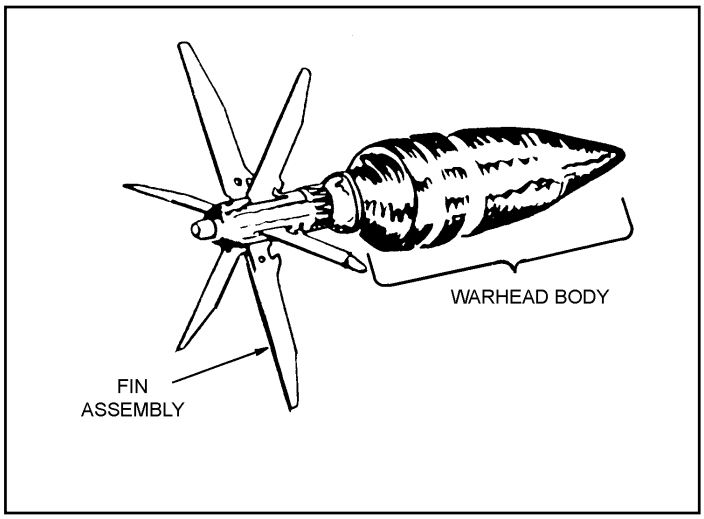


Figure 3-2. 84-mm HEAT cartridge.

a. **Description**. The M136 AT4's warhead has excellent penetration ability and lethal after-armor effects. The extremely destructive, 440 gram shaped-charge explosive penetrates more than 14 inches (35.6 cm) of armor. Warhead effects are shown in Figure 3-3.

(1) ***Impact***. The nose cone crushes; the impact sensor activates the fuze.

(2) ***Ignition***. The piezoelectric fuze element activates the electric detonator. The booster detonates, initiating the main charge.

(3) ***Penetration***. The main charge fires and forces the warhead body liner into a **directional gas jet that penetrates armor plate.**

(4) ***After-Armor Effects (Spalling)***: The projectile fragments and incendiary effects produce blinding light and destroy the interior of the target.

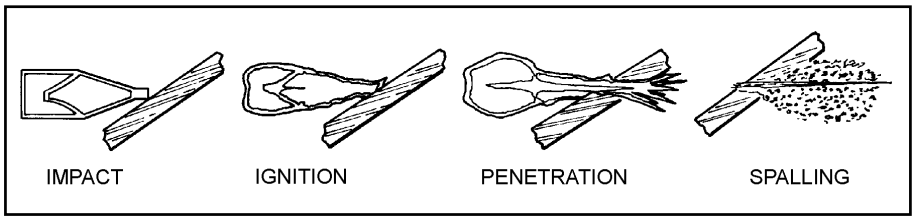


Figure 3-3. Effects of M136 AT4 warhead.

b. **Packaging**. Five M136 AT4s, each wrapped in a plastic barrier bag, are packed together in a wooden container. The containers are too heavy to stack more than four deep on the pallets (Figure 3-4).

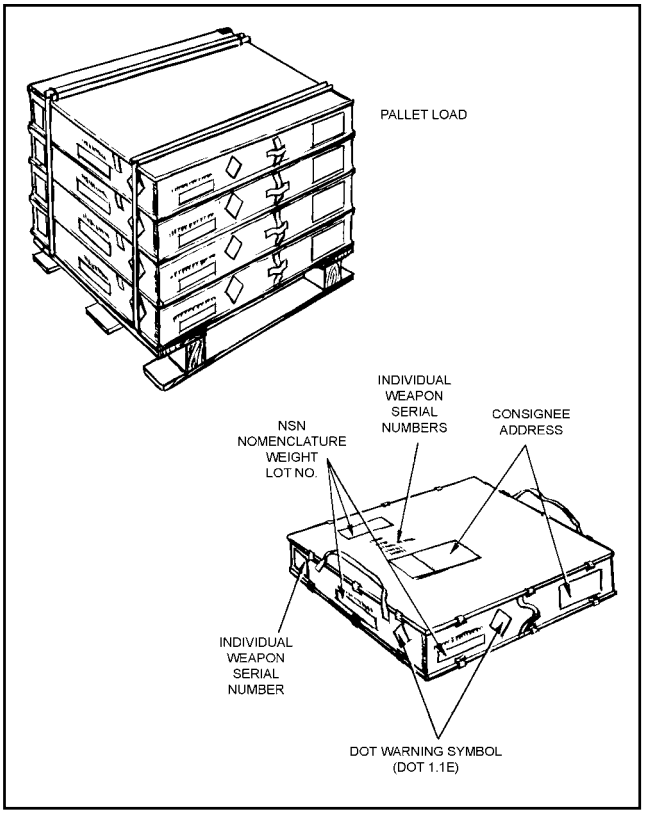


Figure 3-4. Ammunition packaging and markings.

c. **Color-Coding**. M136 AT4 launchers are marked with color-coded bands (Figure 3-5). A black with yellow band indicates an HE antiarmor round (early models had a solid black band). A gold or yellow band indicates a field handling trainer; no band indicates an M287 9-mm tracer bullet trainer (Appendix B).

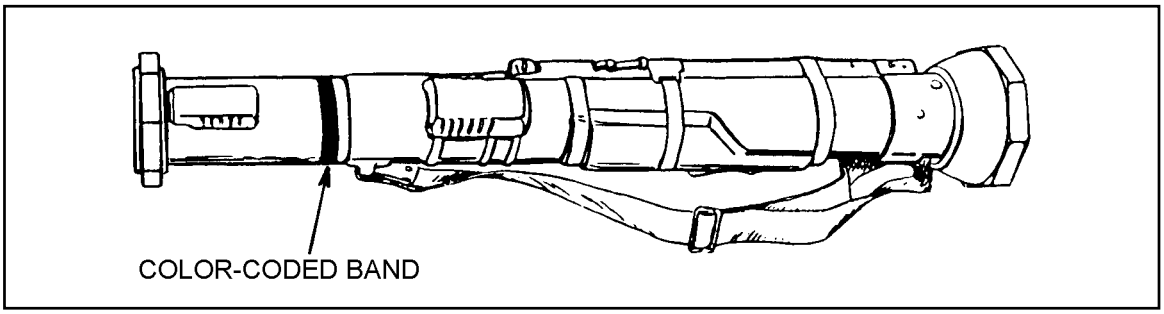


Figure 3-5. Location of color-coded band.

3-4. INSPECTION

Since the M136 AT4 is issued as a round of ammunition rather than as a weapon, the launcher is completely sealed. However, its overall condition should be inspected at the time of issue and again before use (Figure 3-6). The wooden container should be opened, the plastic bags removed, and the launcher visually inspected for obvious damage. If the M136 AT4 is not to be used immediately, it should be returned to its plastic bag and the bag resealed with tape. The soldier issued the weapon must ensure—

- The *rear seal*, a brown acrylic plastic plate inside the *venturi*, is in place and undamaged.
- The *transport safety pin* is in place and fully inserted. The lanyard is attached to the transport safety pin and the launcher. The lanyard should already be wrapped around the launcher clockwise and the transport safety pin inserted in the retainer hole counterclockwise.
- The *cocking lever* is present and in the SAFE (uncocked) position.
- The plastic *fire-through muzzle cover* is in place and undamaged. If it is torn or broken, cut it out and check the launch tube to ensure it is clear of foreign objects. Remove any that you find by turning the tube muzzle downward and gently shaking the launcher.
- The launcher has the correct *color-coded band*.
- The *sights* function properly. Open the sight covers to ensure the sights pop up and are undamaged.
- The *forward safety* does not move when you depress it.
- The *red trigger button* is not missing.
- The launcher body has no cracks, dents, or bulges.
- The *carrying sling* is not frayed and is attached firmly to the launch tube.
- The *shoulder stop* is not broken or damaged, and it unsnaps and folds down.

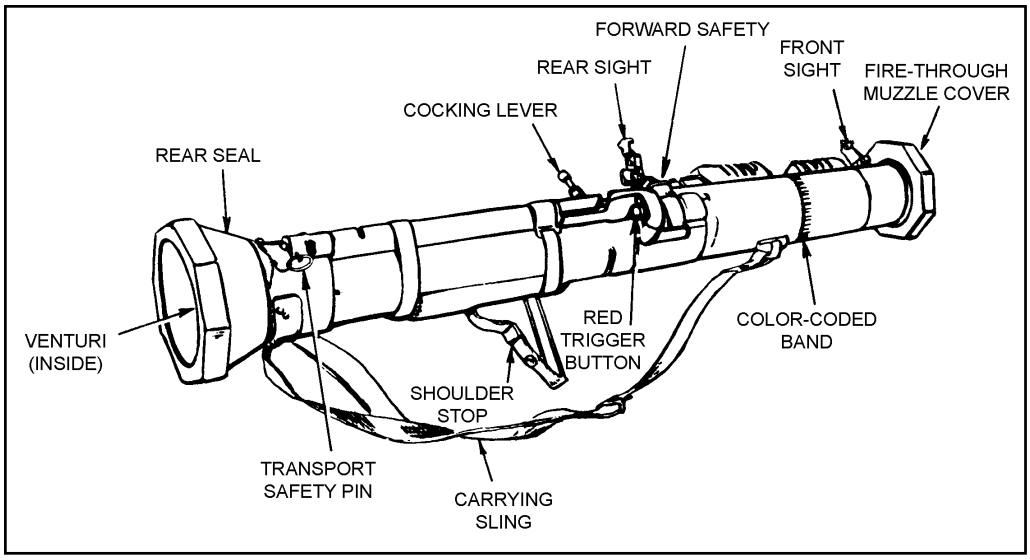


Figure 3-6. Inspection.

3-5. FIRING MECHANISM, SAFETIES, AND WEAPON FUNCTION

The function of the M136 AT4 must be discussed along with its firing mechanism and safety features. The firing mechanism is mechanical and consists of a red trigger button, an enclosed firing rod and spring, and three safety devices (Figure 3-7). The first safety device is the *transport safety* pin. The red trigger button is located between the other two, the *cocking lever* and the *forward safety*. The weapon cannot be fired until all three safeties have been disengaged.

a. **Transport Safety Pin**. This pin blocks the firing pin from striking the cartridge percussion cap. To disengage this pin, pull it outward, then release it.

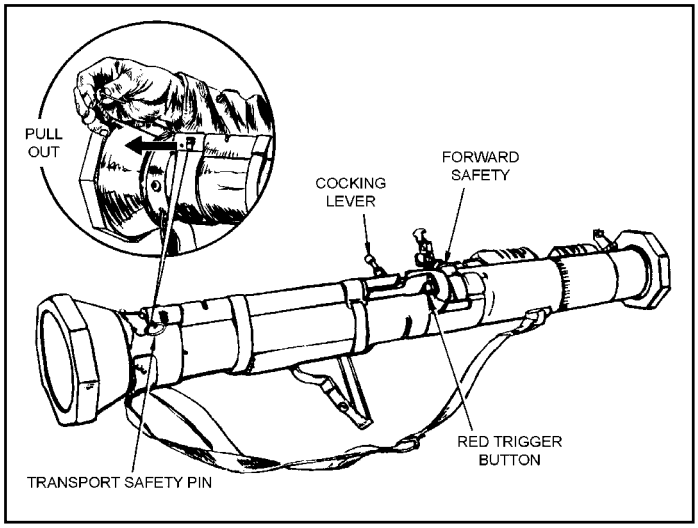


Figure 3-7. Firing mechanism and transport safety pin.

b. **Cocking Lever**. When this lever, which is attached to the firing rod (Figure 3-8), is in the SAFE position, the firing rod and the trigger cannot touch. To cock the AT4, push the lever forward and rotate it downward and to the right with your right thumb. This causes the hooks on the front of the firing rod to catch and hold the red trigger button.

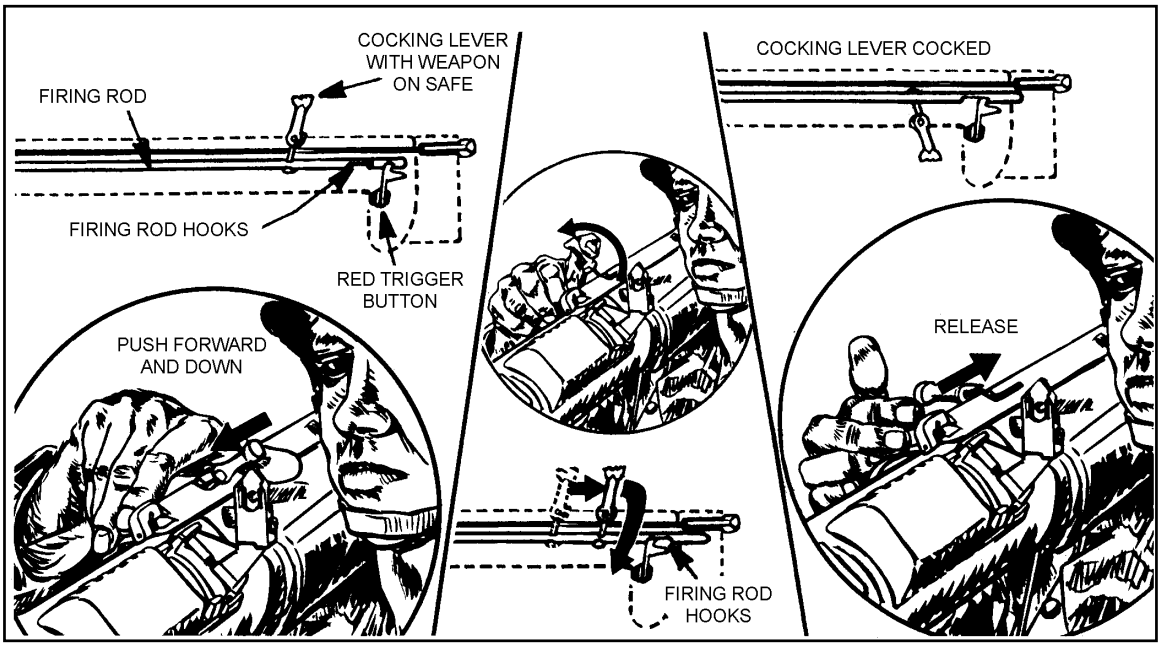


Figure 3-8. Cocking lever.

c. **Forward Safety**. This safety is on the front end of the firing mechanism (Figure 3-9) and is connected to a steel rod with a bent end that blocks the firing rod from striking the firing pin. To fire the M136 AT4, hold down the forward safety so the firing rod can strike the percussion cap and ignite the propellant when you push the trigger.

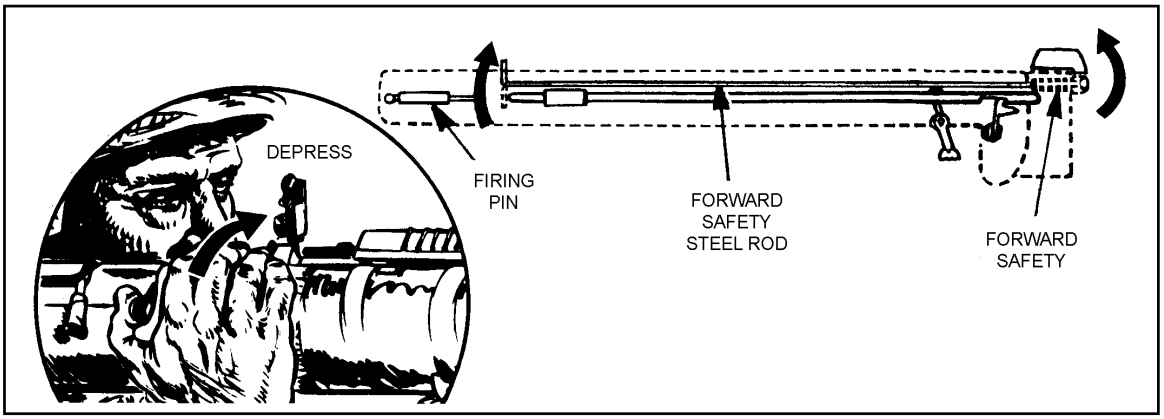


Figure 3-9. Forward safety.

3-6. SIGHTS

The fact that the AT4's front and rear sights resemble those of the M16-series rifle makes using the AT4 easier (Figure 3-10).

a. **Front Sight**. The front sight has a sight blade with a center post and left and right lead posts. A semicircular white line helps you obtain the proper sight picture. To open the front sight cover, press down on it and slide it backward until the sight pops up.

b. **Rear Sight**. The rear sight has a sight blade, range adjustment knob, range scale, 2-mm peephole for normal daylight visibility conditions, and 7-mm peephole for limited visibility conditions. To open the rear sight cover, press down on it and slide it forward until the sight pops up.

c. **Nightsight**. The AT4 can be fitted with the AN/PAQ-4C, AN/PEQ-2, or the AN/PAS-13, when used with the nightsight mounting bracket (NSN 5340-01-391-3004).

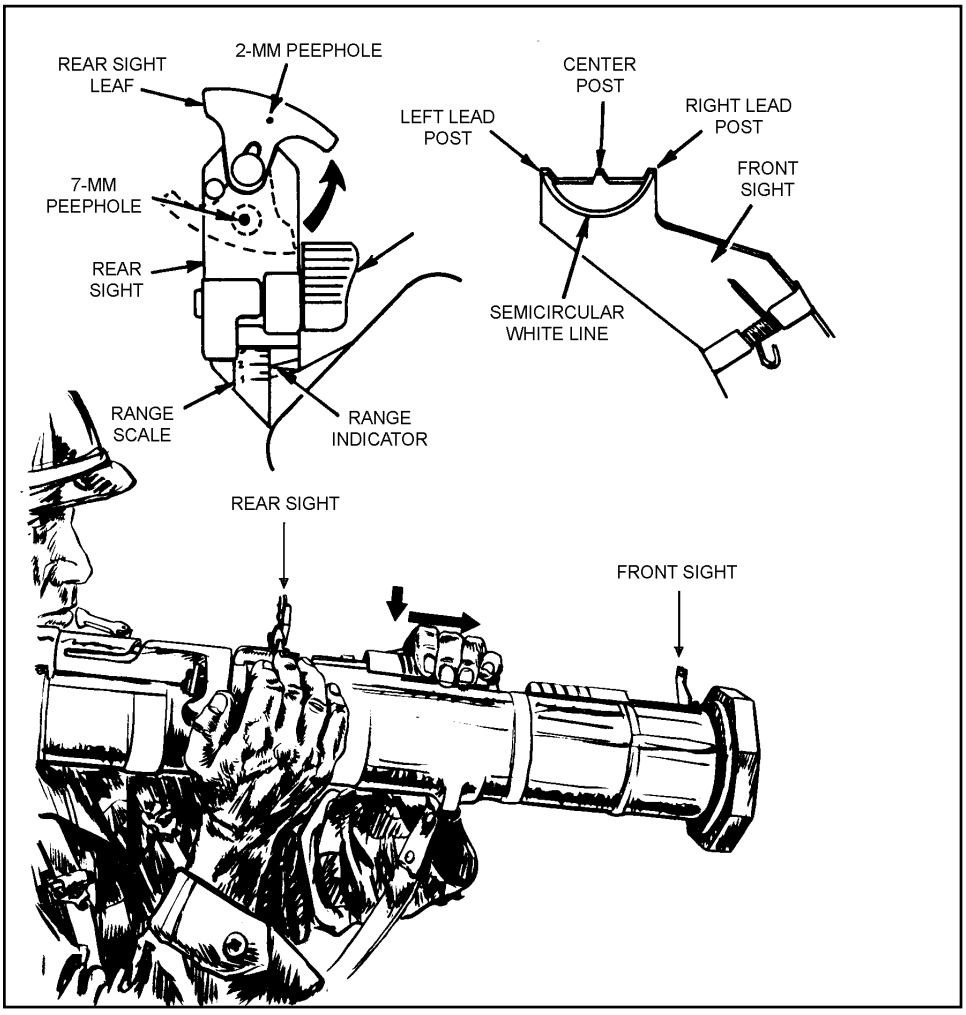


Figure 3-10. Sights.

(1) The leaf blade that covers the 7-mm peephole has its own tiny 2-mm peephole. To uncover the 7-mm peephole, pull the bottom of the leaf blade out slightly and rotate it right and up. To cover the 7-mm peephole, rotate it back down and ensure the leaf blade

is seated. The range indicator scale is indexed from 100 to 500 meters in 50-meter increments.

(2) To increase the range setting beyond 200 meters, turn the range adjustment knob clockwise, or vice versa (Figure 3-11). You must remember to reset the range to 200 meters when you close the rear sight. Otherwise, closing the sight cover will break off the rear sight.

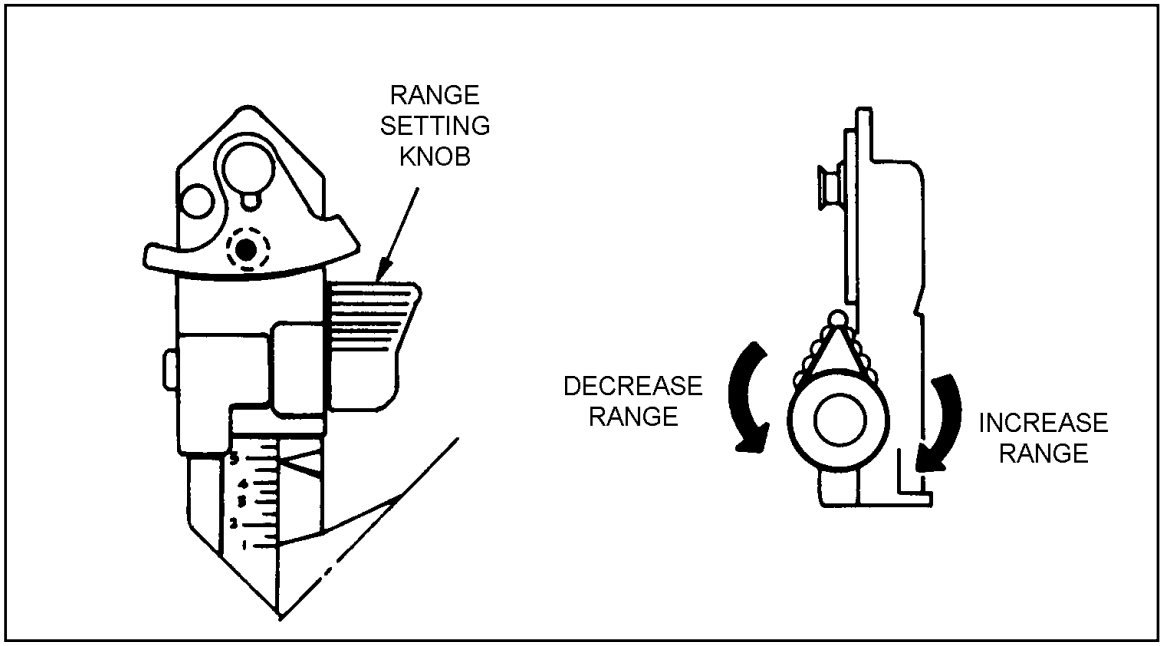


Figure 3-11. Adjusting the rear sight range setting.

3-7. OPERATION

If you are under fire, take cover before preparing the M136 AT4 for firing as follows:

a. Remove the AT4 from its carrying position and cradle it in your left arm (Figure 3-12).

WARNING

Insert the approved brand of earplugs before you fire. Keep the weapon pointed toward the target, and keep the backblast area clear.

Figure 3-12. Cradle position.

b. With your right hand, pull and release the transport safety pin (Figure 3-13). This pin is important—you must reinsert it if you do not fire the launcher. Therefore, unless it is attached to the launcher with a lanyard, you must keep it in a safe place.

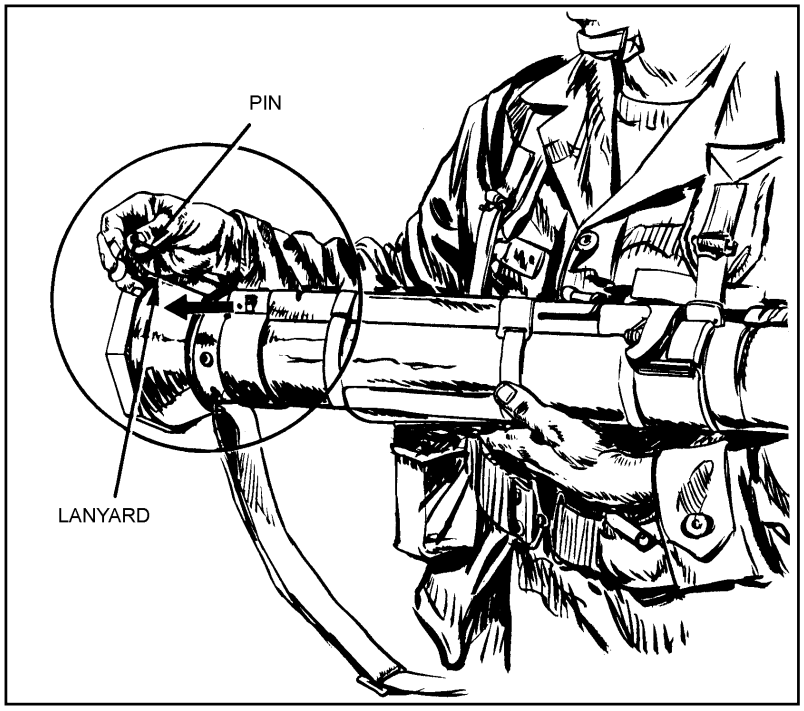


Figure 3-13. Removing the transport safety pin.

c. Unsnap, unfold, and hold the shoulder stop with your right hand (Figure 3-14).

d. Place the launcher on your right shoulder and stabilize it by grasping the sling near the launcher's muzzle with your left hand.

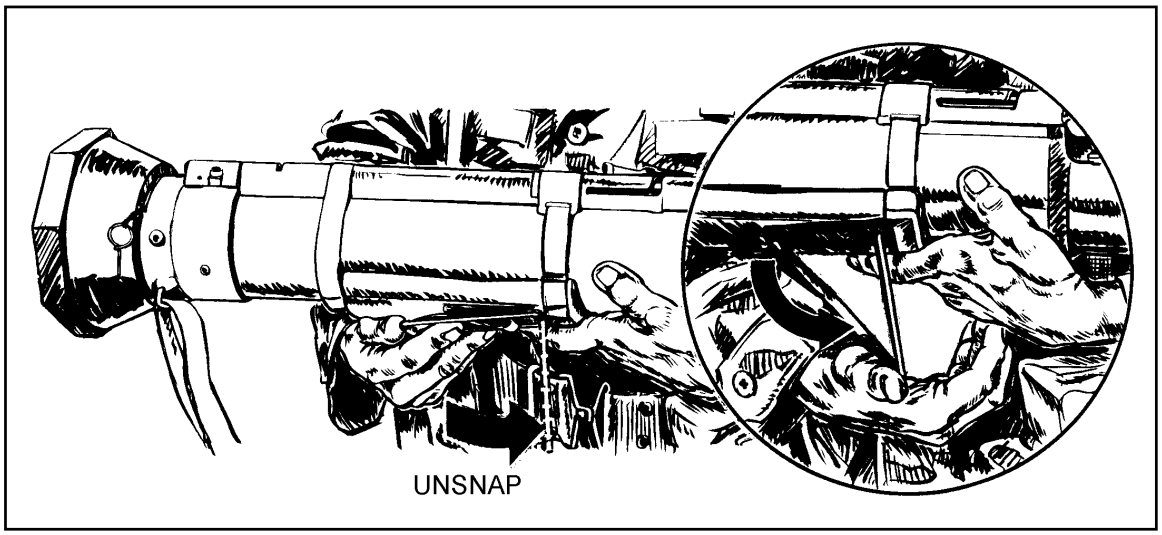


Figure 3-14. Unsnapping the shoulder stop.

e. With the AT4 on your right shoulder, stabilize it with your left hand and open the sights with your right hand. Press down and pull backward on the front sight cover until the front sight pops up (Figure 3-15), then press down and forward on the rear sight cover until the rear sight pops up. The rear sight should be no less than 2 1/2 inches and no more than 3 inches from your eyes.

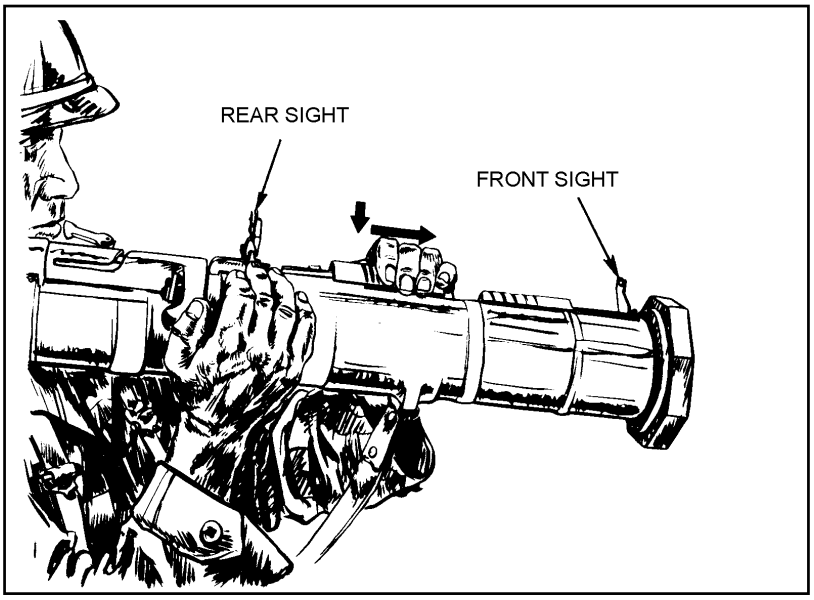


Figure 3-15. Opening and adjusting the sights.

f. Set the rear sight for the correct range to the target.

g. Check the backblast area before you cock the launcher. Then, with your right hand, unfold the cocking lever (Figure 3-16). Place your thumb under it and, with the support of your fingers in front of the firing mechanism, push it forward, rotate it downward and to the right, and let it slide backward.

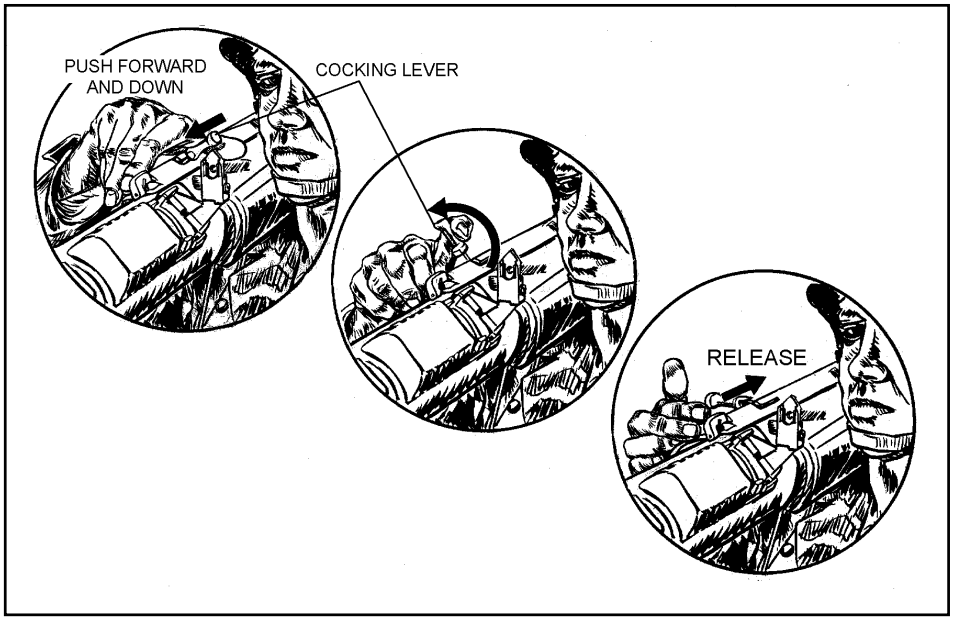


Figure 3-16. Cocking the launcher.

h. Pull back on the sling with your left hand to seat the shoulder stop firmly against your shoulder. To avoid a misfire, use the index and middle fingers on your right hand to hold the forward safety down and to the left while you fire (Figure 3-17, page 3-12).

3-8. MISFIRE PROCEDURES

A misfire is a complete failure to fire caused by a procedural or mechanical failure. Which misfire procedures should be used depends on whether the firer is in a combat or training environment.

a. **Causes**. A misfire is usually caused by one of the following factors:

The forward safety is not depressed far enough to disengage the safety.
The firing mechanism is faulty.
The propelling charge explosive train is faulty.

WARNING
Keep your weapon pointed toward the target.

Figure 3-17. Firing the launcher.

b. **Combat Environment**. If a misfire occurs in combat—

(1) Release the forward safety.

(2) Remove your right hand from the firing mechanism and cock the weapon again.

(3) Try to fire again. If the launcher still does not fire, maintain the same firing position and return the cocking lever to the SAFE (uncocked) position.

(4) Move the launcher from your shoulder, keeping the launcher pointed toward the enemy. Reinsert the transport safety pin.

(5) In combat, break off the sights to identify the misfired launcher. In training, however, you would not want to damage the field handling trainer (FHT), so identify the misfired launcher simply by leaving the sights up.

(6) Place the launcher on the ground, pointed toward the enemy, and use another launcher. As soon as you can, dispose of the misfired launcher IAW unit SOP.

c. **Training Environment**. If a misfire occurs on a live-fire training range, the soldier responds as follows (the trainer later disposes of the launcher IAW local SOP):

(1) Shouts "Misfire" as soon as the launcher fails to fire while maintaining the original sight picture.

(2) Releases the forward safety.

(3) Recocks the launcher: Immediately removes his right hand from the firing mechanism and pushes the cocking lever forward with the heel of his right hand until the lever locks with a loud clicking noise.

NOTE: Because performing immediate action takes so little time, you need not recheck the backblast area.

(4) Press the forward safety all the way down and try to fire again. If the launcher still fails to fire, shout misfire, release the forward safety, and move the cocking lever to the SAFE (uncocked) position. Move the launcher from your shoulder, keeping the weapon pointed toward the target and cradled in your left arm.

(5) Reinsert the transport safety pin, wait two minutes, then carefully lay the launcher on the ground, muzzle toward the target.

NOTE: Notify the local ammunition supply and issue point of any unusual occurrence, regardless of whether the weapon fires or not. Examples include excessive overpressure, recoil, or heat on your face after you have fired the weapon (caused by the propellant burning after the round leaves the muzzle).

3-9. RESTORATION TO CARRYING CONFIGURATION

If the launcher is prepared to fire, but then is not fired, it must be taken out of operation as follows:

a. Release the forward safety.

b. Push forward and to the left on the cocking lever, and let it spring back into the SAFE (uncocked) position.

c. Move the launcher from your shoulder, ensuring the muzzle is pointed in the direction of fire.

d. With the launcher cradled in your left arm, replace the transport safety pin until it is fully seated in the retainer hole.

e. To avoid breaking off the rear sight, remember to reset the range indicator to the 200-meter setting before closing the rear sight cover.

f. Lay down the sights and close their covers.

g. Snap the shoulder stop into the closed position.

h. Sling the launcher over your right shoulder and move to another location.

CHAPTER 4

MARKSMANSHIP FUNDAMENTALS

Many factors contribute to light antiarmor weapon marksmanship. Soldiers who combine these factors well, and continue to practice doing so, can retain their skills. The factors are grouped into four basic areas known as marksmanship fundamentals: steady hold, aiming procedures, breath control, and trigger manipulation. Instructions are given for right-handed firers, but the M72-series LAW can be fired from either shoulder by simply reversing the instructions.

4-1. STEADY HOLD

Maintaining a steady hold involves holding the launcher as steady as possible while sighting and firing. To maintain the proper sight picture and sight alignment until he fires, the firer must hold the launcher in a tight, comfortable position so that it becomes a natural extension of his body (Figure 4-1). With both weapons, keep your elbows close to your body to help balance the weapon and prevent you from jerking or flinching when you fire. In the case of the AT4, this reduces recoil.

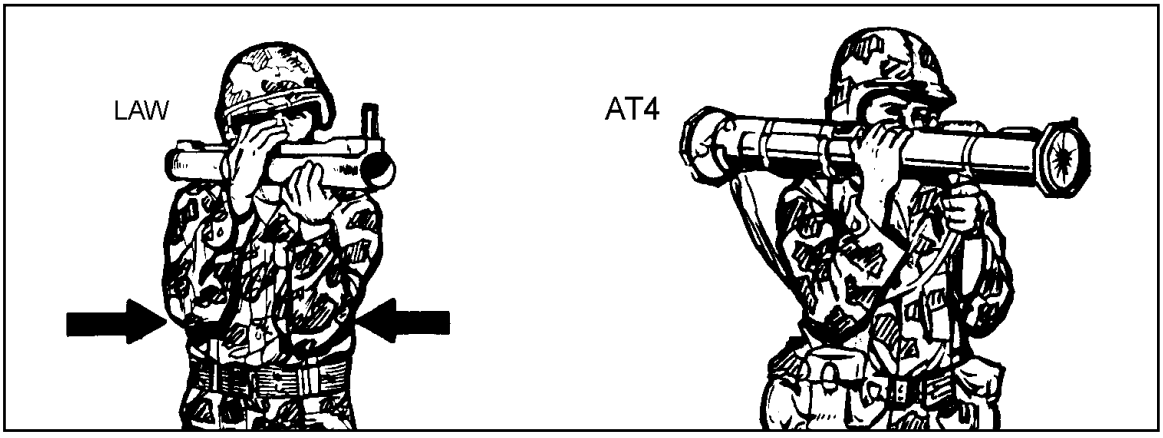


Figure 4-1. Steady hold position.

a. **M72-Series LAW**. Place your left hand, palm facing upward, under the launcher near the muzzle and grasp the launcher. Firmly pull the rear cover into your right shoulder pocket.

b. **M136 AT4**. With your left hand, grasp the carrying sling where it attaches to the launcher near the muzzle. With your right hand on the trigger mechanism, pull the shoulder stop into your right shoulder pocket.

4-2. AIMING PROCEDURES

Aiming procedures include placing the eye correctly, obtaining a sight picture, and aligning the sight. Combining these procedures is critical to correctly aiming light antiarmor weapons.

a. **Eye Placement**. Before sighting the weapon, estimate the range (Chapter 6 discusses range estimation). For the M72-series LAW, place your firing eye as close to the rear sight as is comfortable. However, for the M136 AT4, place your firing eye between 2 1/2 to 3 inches (no nearer than 2 1/2 inches) from the rear sight. This distance is necessary to prevent possible injury from the weapon's recoil and for correct sight alignment with the AT4 (Figure 4-2).

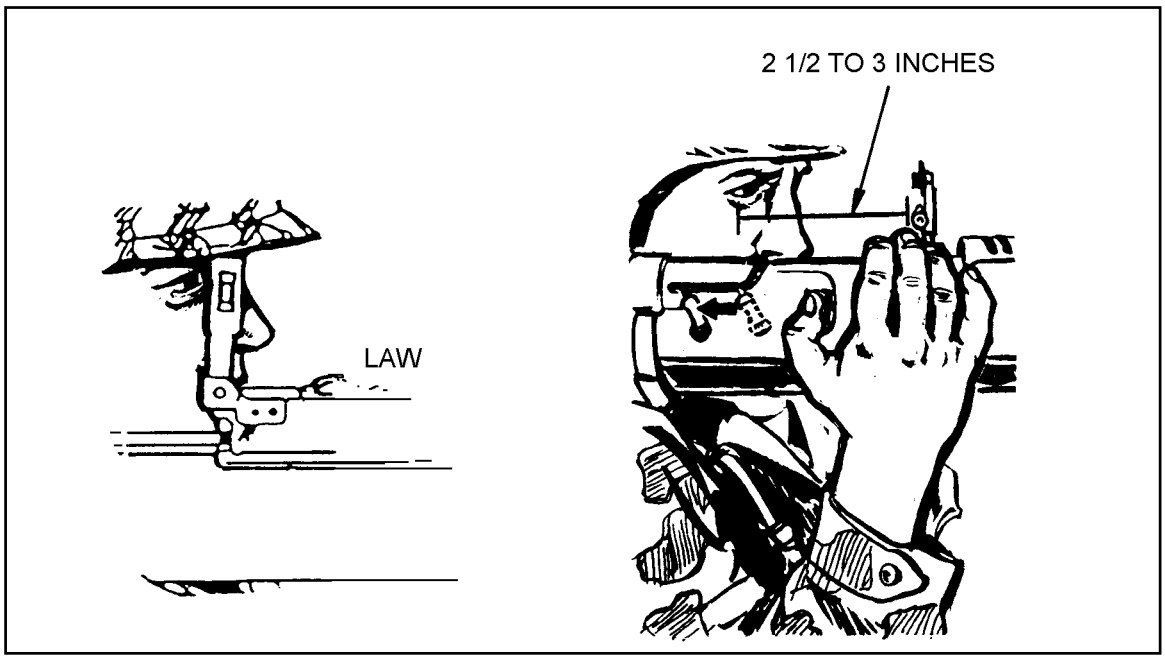


Figure 4-2. Eye placement.

WARNING

When firing the M136 AT4, do not place your eye within 2 1/2 inches of the rear sight. The AT4s recoil could cause the rear sight to injure your firing eye.

b. **Sight Alignment**. Align the sights correctly with the target. To do this for the M72-series LAW, position the rear sight so that your eye is near and in line with the peephole in the rear sight. Look through the peephole at the front sight reticle and place the range line that corresponds to the target's range on the target (Figure 4-3). To do this for the AT4, position the rear sight so that the white semicircle of the front sight is a hazy line around the bottom half of the rear sight opening. Position the front sight posts on the target (Figure 4-4). Align the sight by moving your head forward or backward.

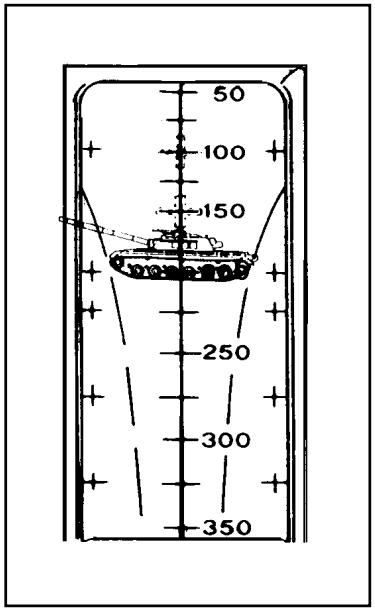


Figure 4-3. Sight alignment for the M72-series LAW.

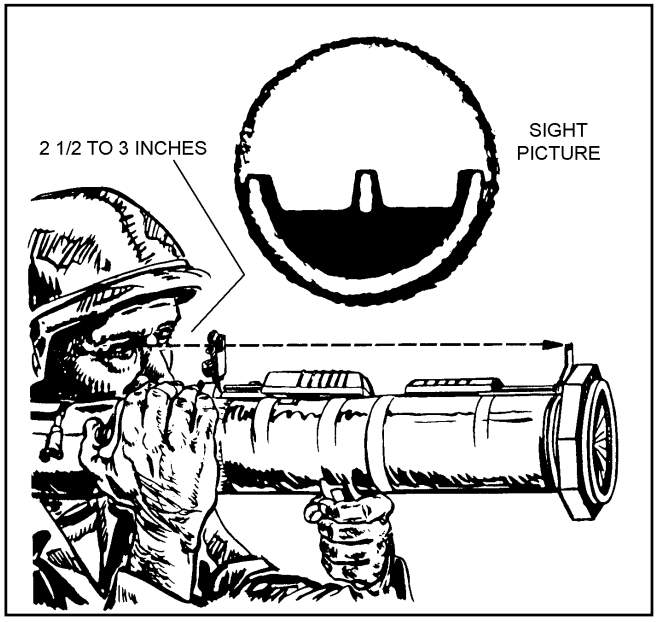


Figure 4-4. Sight alignment for the M136 AT4.

c. **Sight Picture**. Position the front sight on the target.

(1) ***M72-Series LAW***. *Stationary targets* include those moving directly toward or away from the firer. Place the correct vertical range line in the center of the target (Figure 4-5). *Slow-moving targets* include those with an estimated speed of 5 mph or slower, or those moving in an oblique direction. Place either the left or right lead cross mark on the vehicle's center of mass (Figure 4-6). *Fast-moving targets* include those with an estimated speed of more than 5 mph. Place either the left or right lead cross mark on the leading edge of the vehicle (Figure 4-7).

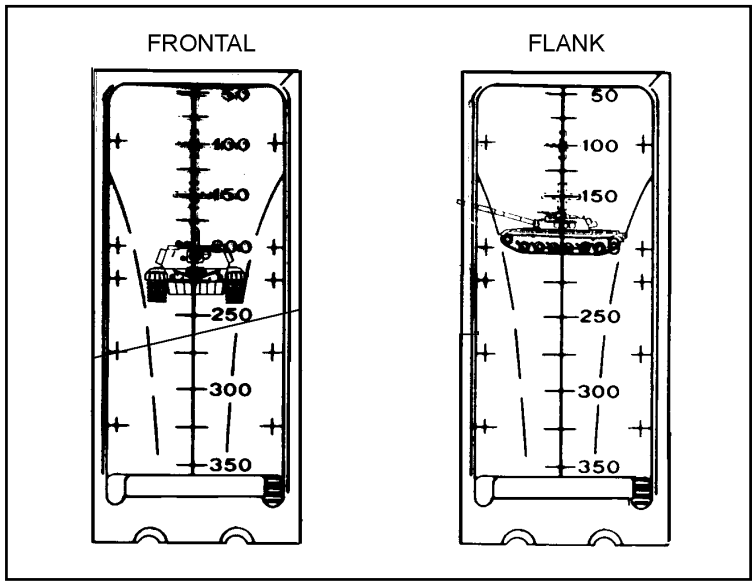


Figure 4-5. Sight picture, stationary targets, M72-series LAW.

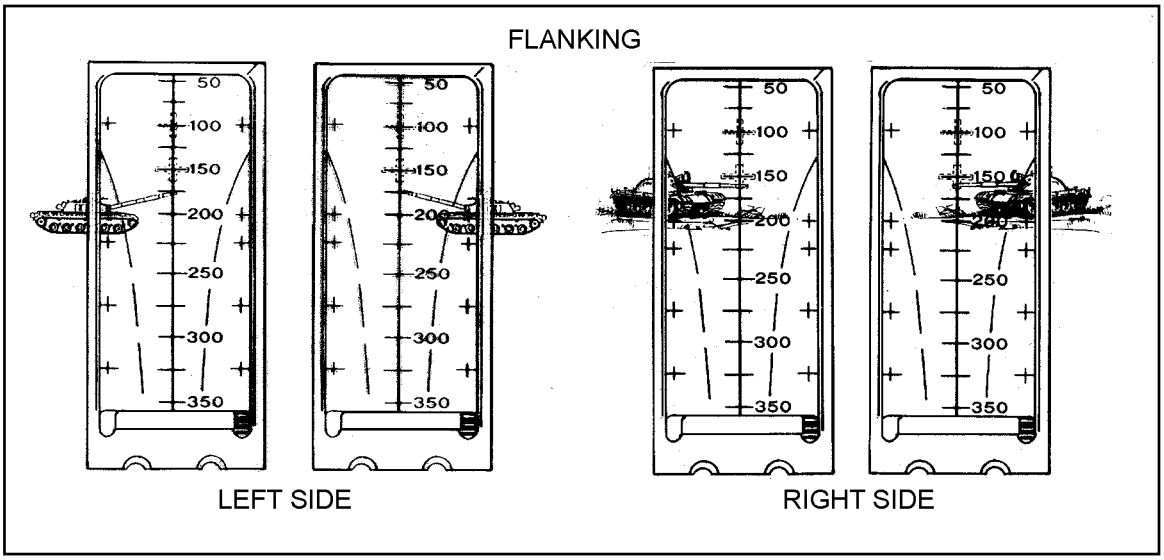


Figure 4-6. Sight picture, slow-moving targets, M72-series LAW.

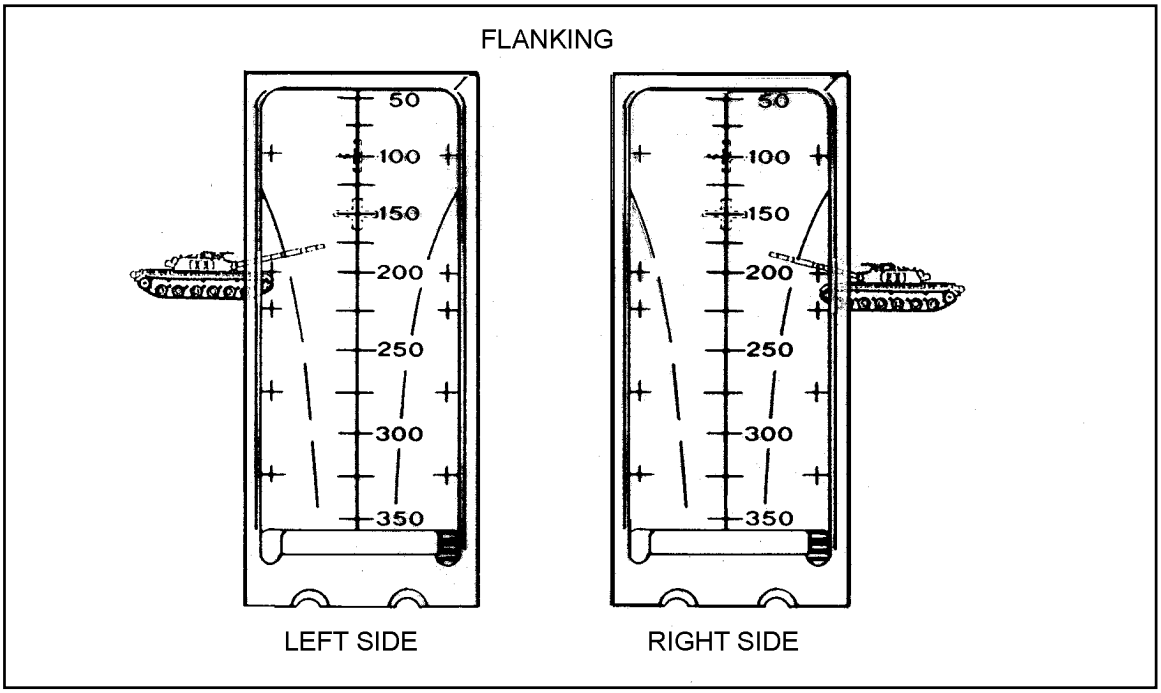


Figure 4-7. Sight picture, fast-moving targets, M72-series LAW.

(2) ***M136 AT4***. *Stationary targets* include those moving directly toward or away from the firer. Adjust the rear sight for the correct range and place the center sight post in the center of the target (Figure 4-8). *Slow-moving vehicles* are those with an estimated speed of 10 mph or less, or those moving in an oblique direction. Place the center sight post on the front or leading edge of the vehicle (Figure 4-9). *Fast-moving vehicles* are those estimated to be moving faster than 10 mph. Place either the left or right lead post on the

center of the target. For example, if the target is moving from left to right, place the left lead post on the target's center of mass, and vice versa (Figure 4-10).

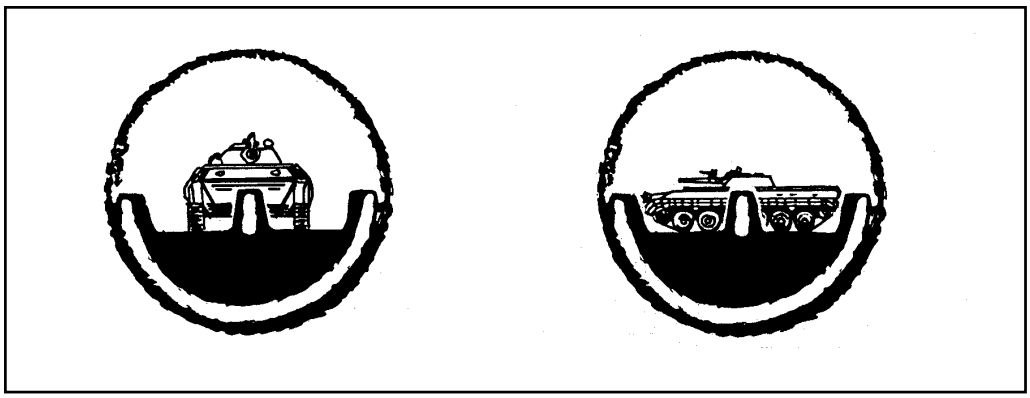


Figure 4-8. Sight picture, stationary targets, M136 AT4.

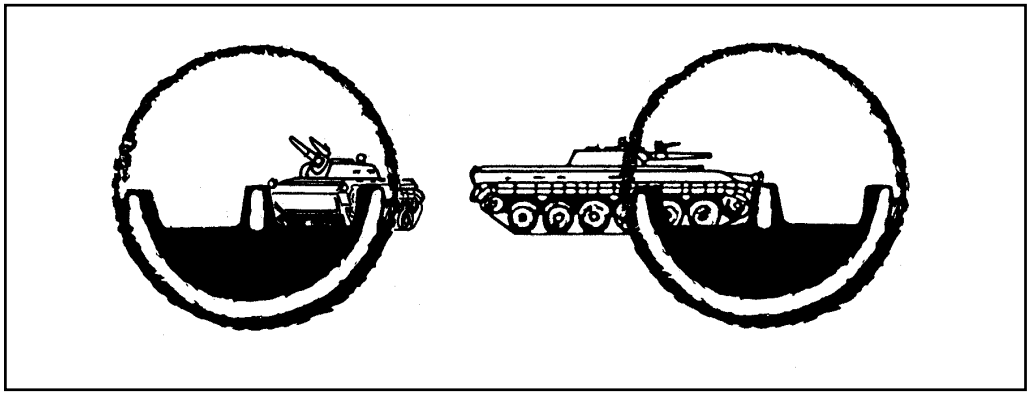


Figure 4-9. Sight picture, slow-moving targets, M136 AT4.

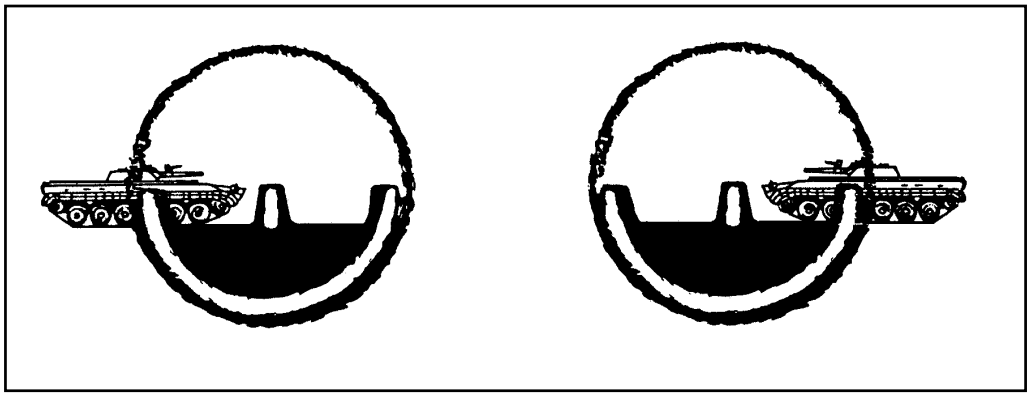


Figure 4-10. Sight picture, fast-moving targets, M136 AT4.

4-3. BREATH CONTROL

Breath control is as important when firing a light antiarmor weapon as it is when firing an individual weapon. Breathing while firing can cause a miss. To control breathing, the firer breathes deeply a couple of times, takes one last deep breath, exhales partly, holds his breath, sights, and fires.

4-4. TRIGGER MANIPULATION

Light antiarmor weapons have different types of triggers (Figure 4-11).

a. **LAW**. To fire the LAW, the firer must apply firm and steady downward pressure to the trigger with the fingers of his firing hand.

b. **AT4**. To fire the AT4, the firer must apply firm and steady forward pressure to the trigger with the thumb of his firing hand. Soldiers can practice trigger manipulation and control techniques on an expended launcher or FHT.

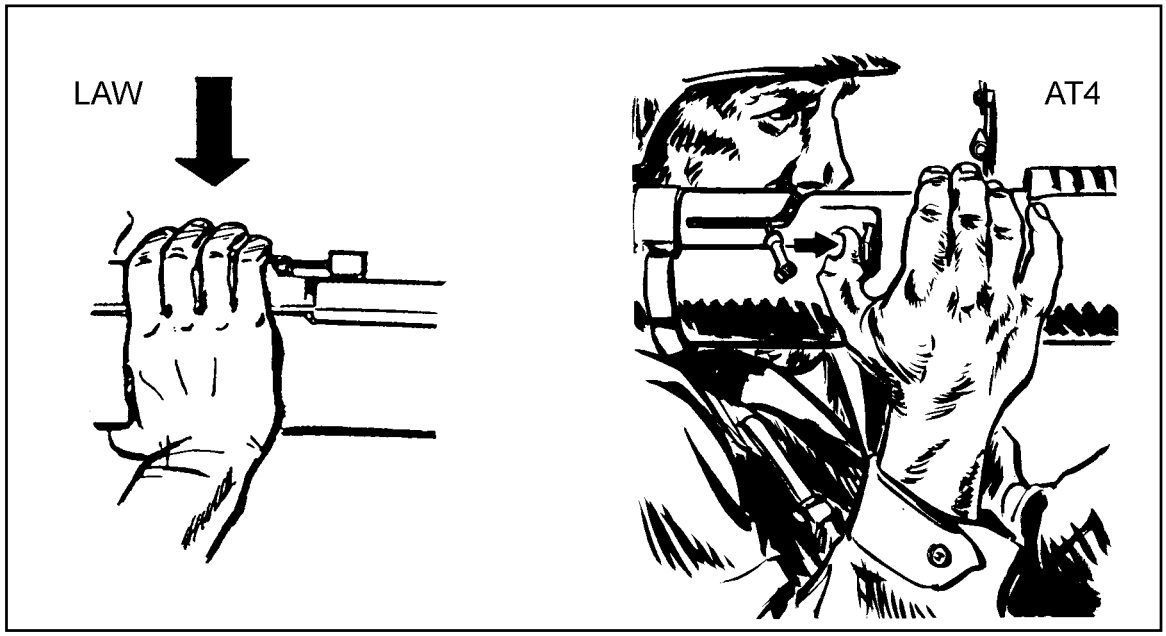


Figure 4-11. Trigger manipulation.

4-5. INTEGRATED ACT OF SHOOTING

Correct sight alignment is critical. Sight alignment errors increase as the range to the target increases. Therefore, maintaining the correct relationship between the rear and front sights is as important as placing the aiming point. The steps for doing this should become automatic. No matter how quickly they are done, these steps are always distinct, because the human eye can only focus at one distance and on one point at a time. The firer focuses on the front sight to obtain correct sight alignment, then places the aiming point to complete the sight picture. He shifts or adjusts the position of the launcher as necessary. The whole time he is pressing the trigger, he maintains the sight picture.

CHAPTER 5
FIRING POSITIONS

This chapter explains the basic firing positions used with light antiarmor weapons. Instructions for each are given for right-handed firers, but the M72-series LAW can be fired from either shoulder by simply reversing the instructions. Though each weapon can be fired from all four of the basic firing positions, individual physique determines exact body and hand positions. Firing from a supported position naturally increases accuracy, which improves the odds for a first-round hit or kill. Basic safety considerations are the same for all light antiarmor weapons, but additional considerations for each firing position are provided here.

5-1. STANDING POSITION

Two standing positions are used: a basic standing position and one modified for the infantry fighting position.

a. **Basic Standing Position**. Raise the launcher slightly higher than shoulder level. Execute a left face, rotate your shoulder under the launcher, and spread your feet a comfortable distance apart. Move your left foot 15 to 24 inches forward, keeping your hips level and your weight balanced on both feet. To obtain a firm, stable position, tuck both elbows tightly into your body. To track a moving target, turn your body at the waist—not with your legs. This enables you to track the target smoothly. Unless you are behind a protective barrier such as a wall, the standing position exposes you more than any other position to enemy observation and possible suppression. Differences between weapons with respect to the standing position are as follows (Figure 5-1, page 5-2):

WARNING
Always keep the launcher pointed in the direction of fire.

(1) ***M72-Series LAW***. Place your nonfiring hand about 4 inches from the front of the muzzle, with your firing hand on the rear cover. After placing the weapon on your shoulder, release the rear cover and place your firing hand on the trigger. Cup the launcher in the palm of your nonfiring hand. Position your firing eye as close to the rear sight as is comfortable.

(2) ***M136 AT4***. Grasp the sling near the launcher with your left hand and the shoulder stop with your right hand. Raise the launcher above shoulder level. After placing the launcher on your shoulder, release the shoulder stop and place your right hand on the trigger. Place your firing eye 2 1/2 to 3 inches from the rear sight.

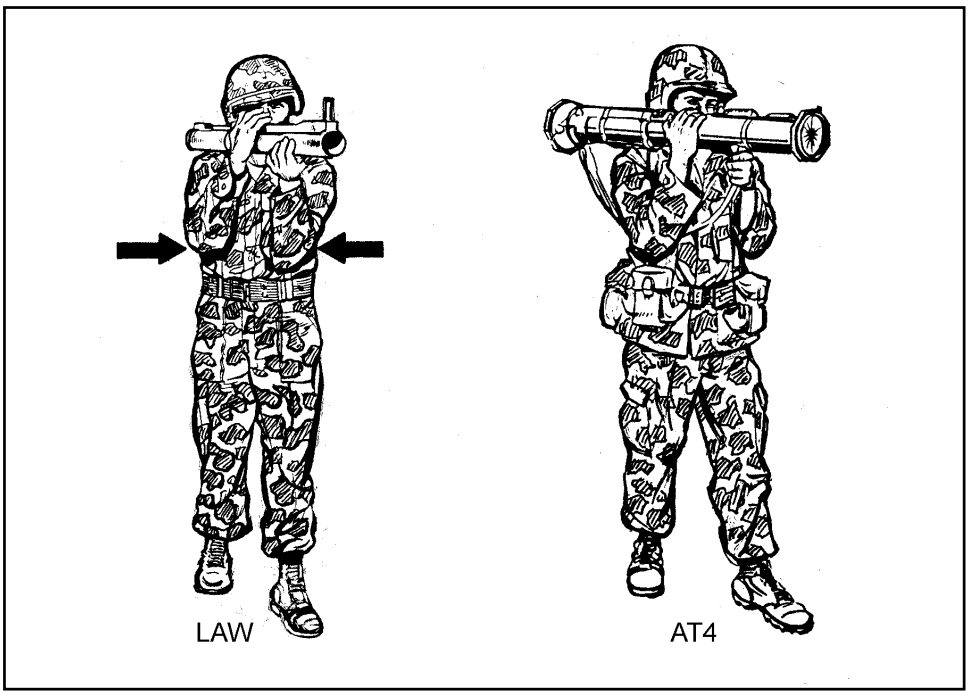


Figure 5-1. Basic standing position.

b. **Modified Standing Position**. Use this position when you occupy an infantry fighting position. Assume the basic standing position, but instead of stepping forward, lean against the back wall of the fighting position. Ensure that the venturi or rear of the weapon extends beyond the rear of the fighting position. Figure 5-2 shows the modified standing position for the M72-series LAW; Figure 5-3 shows the modified standing position for the M136 AT4. Ensure that NONE of the following are in your backblast area:

- Other soldiers.
- Other fighting positions.
- Equipment.
- Any part of your own fighting position.
- Obstructions within 5 meters.

NOTE: Leaders must ensure that light antiarmor weapons are positioned so that the backblast misses other fighting positions.

DANGER

NEVER FIRE FROM WITHIN A COMPLETELY ENCLOSED, UNVENTILATED BUNKER OR FIGHTING POSITION.

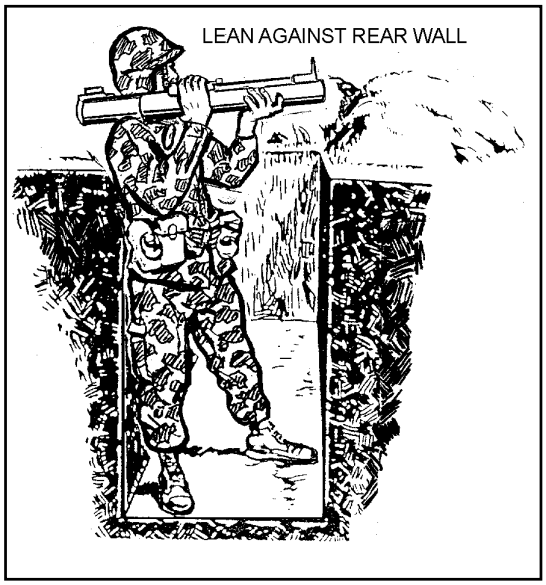


Figure 5-2. Modified standing, position, M72-series LAW.

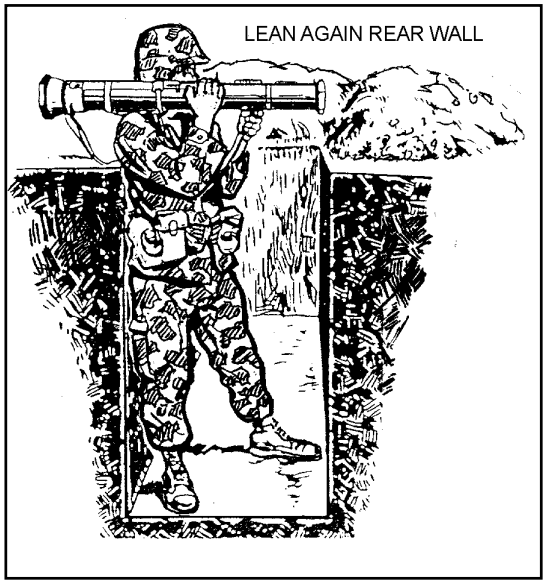


Figure 5-3. Modified standing position, M136 AT4.

5-2. KNEELING POSITION

The basic kneeling position is the best position for tracking moving targets. The modified kneeling position is best for engaging stationary targets, since it is a supported position. However, either can be used for stationary or moving targets.

a. **Basic Kneeling Position**. Kneel from the basic standing position onto your right knee, keeping your left thigh parallel to the ground. Rotate your lower right leg 90 degrees to the left. (This removes your right foot from exposure to the backblast.) Keep your right thigh and back straight and perpendicular to the ground. Point your left foot in the direction of fire and tuck your elbows in to your sides. Though this is not a supported position, it should be a firm, stable one. Figure 5-4 shows the basic kneeling positions for the LAW and AT4.

b. **Modified Kneeling Position**. From the basic kneeling position, sit back on your right heel. Place the back of your upper left arm on your left knee, making sure you do not have bone-to-bone contact between your left elbow and left knee. Keep your right elbow tucked in close to your right side. Use any protective barriers available. Figure 5-5 shows the modified kneeling positions for the LAW and AT4.

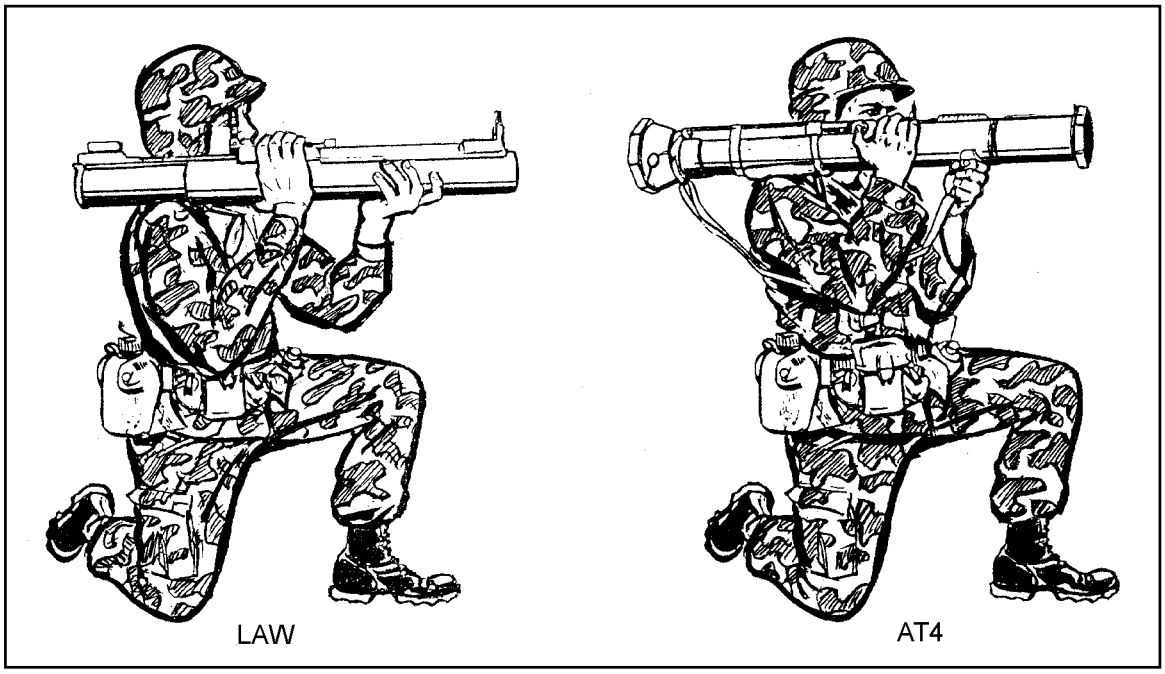


Figure 5-4. Basic kneeling positions.

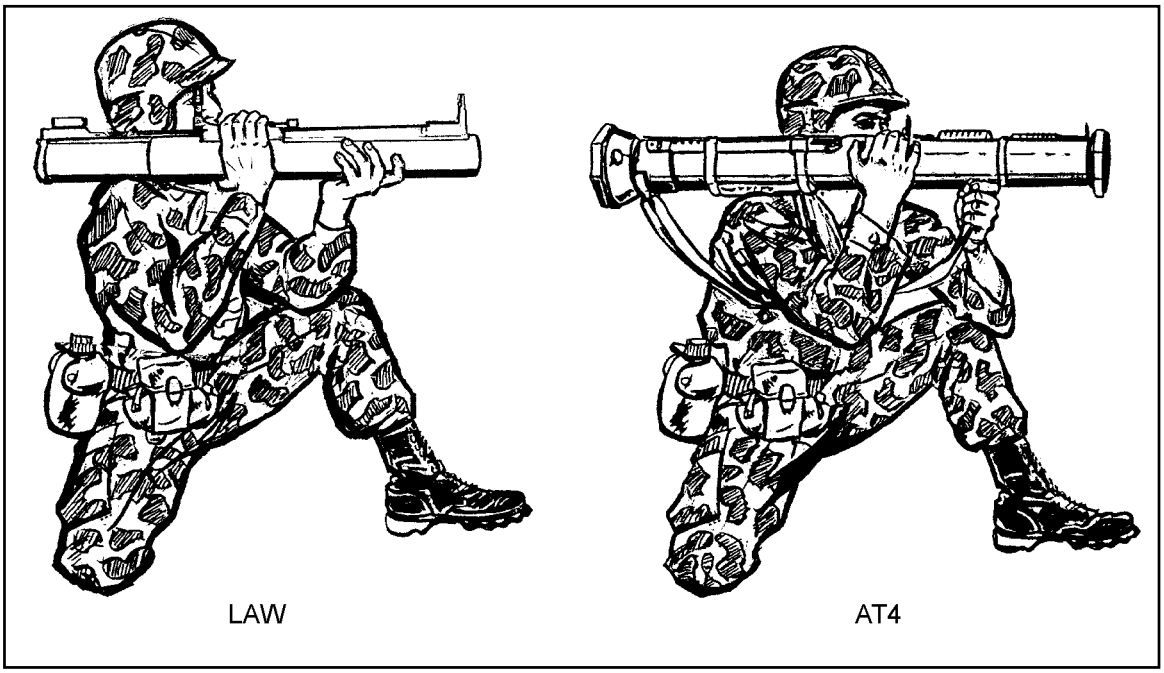


Figure 5-5. Modified kneeling positions.

5-3. SITTING POSITION

The sitting position is the most stable firing position. In this position, the arms are placed on the legs for support. Depending on his physique, the firer can use either of two versions of the sitting position. Either is suitable for engaging stationary targets.

a. **Basic Sitting Position**. Sit on your buttocks while facing the target, and spread your feet a comfortable distance apart. Lean forward and place the backs of your upper arms on your knees, avoiding bone-to-bone contact. Figure 5-6 shows the basic sitting positions for the LAW and AT4.

b. **Modified Sitting Position**. From the basic sitting position, cross your ankles for added support. Raise or lower your knees to adjust for elevation on the target. Figure 5-7 shows the modified sitting positions for the LAW and AT4.

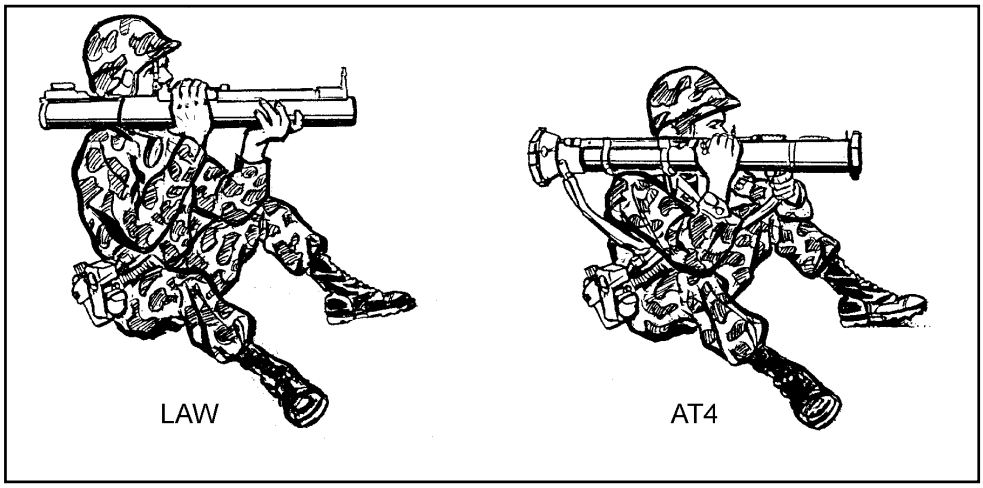


Figure 5-6. Basic sitting positions.

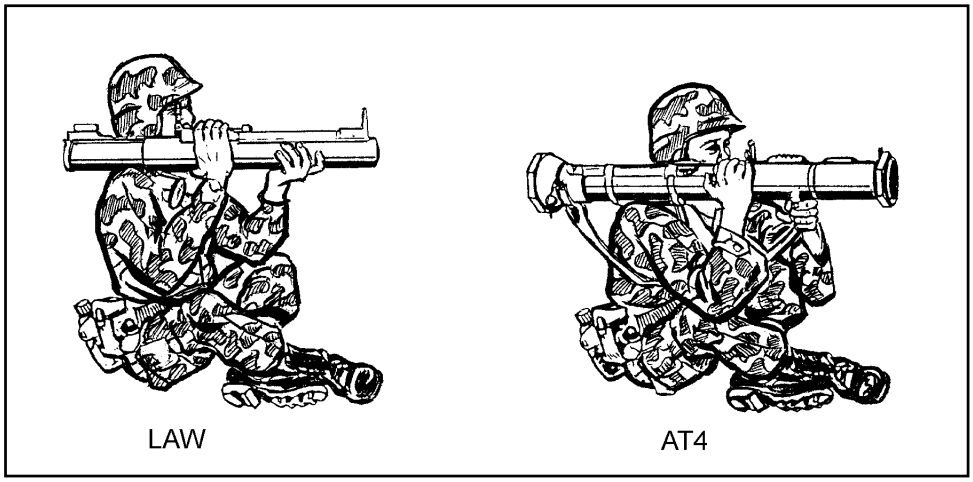


Figure 5-7. Modified sitting positions.

5-4. PRONE POSITION

The prone position is the most dangerous position due to its proximity to the ground. Ideally, the ground should slope downward from the rear of the launcher. This slope reduces the effects of the backblast.

a. Lie on your stomach with your body at a 90-degree angle to direction of fire, and with your body and legs to the left of the direction of fire.

b. *Ensure that neither the body nor the legs are in the backblast area.*

c. Unlike other firing positions, this one prevents you from placing the launcher on your right shoulder. Instead, you must hold the launcher in place against your upper right arm. For stability, apply extra pressure on the firing mechanism with your right hand. The prone position is the *least* stable of all firing positions. You must practice it often to become confident using it. Figure 5-8 shows the prone positions for the LAW and AT4.

DANGER

FAILURE TO MAINTAIN A 90-DEGREE ANGLE FROM THE DIRECTION OF FIRE COULD CAUSE INJURY OR DEATH TO THE FIRER.

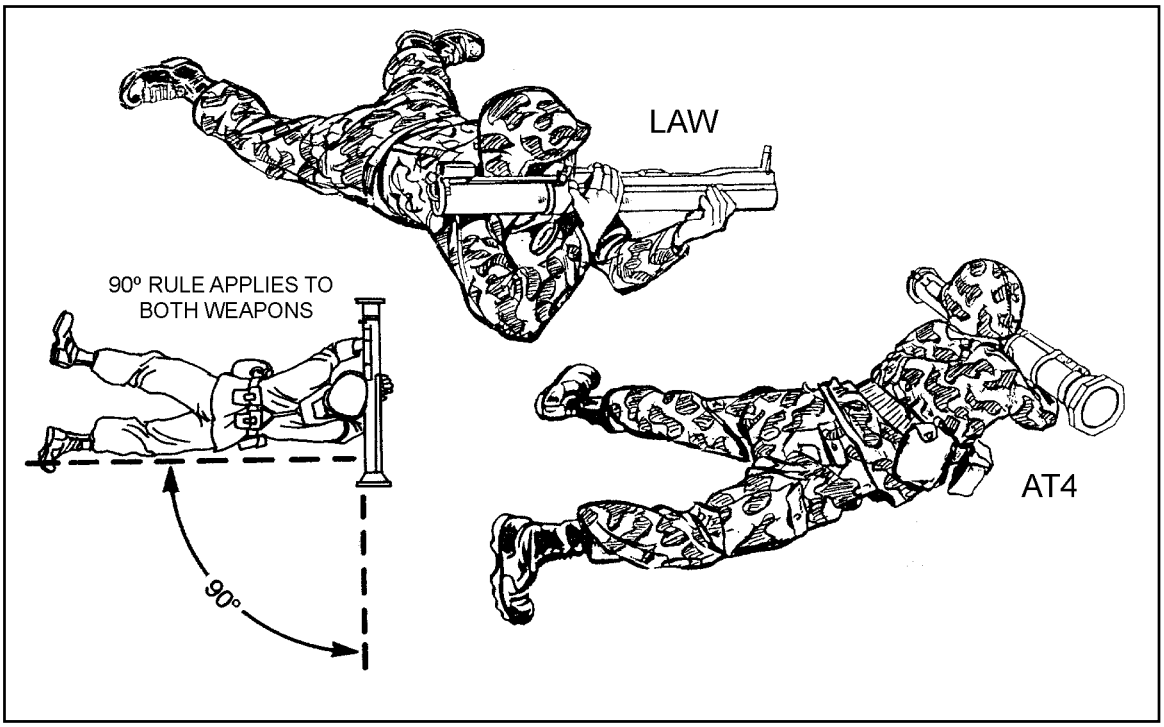


Figure 5-8. Prone positions.

CHAPTER 6
COMBAT TECHNIQUES

This chapter discusses employment techniques for light antiarmor weapons, all of which require at least basic gunnery skills. Techniques that require advanced skills are identified as such.

6-1. RANGE ESTIMATION

A firer who can accurately estimate the range to the target has a better chance of hitting it, regardless of the weapon used. Common methods of estimating range are listed below from the most to the least accurate. The tactical situation determines the method to be used:

a. Using range finders.
b. Measuring the distance on a map after correctly plotting your own position.
c. Pacing. Remember your individual pace count.
d. Using pair and sequence methods of target engagement. This method should be used only when in contact with the enemy.
e. Estimating range visually. This is the least accurate method of estimating range and therefore the least desirable. However, in an offensive operation or hasty defense, it may be the only method available to the light antiarmor firer. Thus, soldiers must continually train to improve their skill at visual estimation (STP 21-1-SMCT). Leaders should identify, coordinate, and record ranges to possible armored vehicle engagement locations on squad and platoon sector sketches.

6-2. SPEED ESTIMATION

Of the weapons discussed in this manual, the M136 AT4 is the best for engaging moving armored vehicles. One of its advantages over the LAW is the speed of its round, which travels faster and farther than the LAW round. However, the firer is the key in any engagement, especially a moving target engagement. Once soldiers learn to estimate speeds at known ranges, they should rehearse until they achieve a high hit-to-kill ratio. As their abilities improve, the leaders vary the ranges, speeds, and types of armored vehicles (Figure 6-1, page 6-2). Trainers and soldiers develop other methods through practice and are limited only by their imaginations. (Chapter 4 discusses obtaining a sight picture in detail.) Estimate how far the vehicle travels in 1 second:

a. Start when the front end of the vehicle passes the object.
b. Count, “One thousand and one” (takes about one second).
c. If *more* than half of the vehicle passes the object, estimate it as a *fast-moving* vehicle (10 mph or faster). If *less* than half of the vehicle passes the object, estimate it as a *slow-moving vehicle* (less than 10 mph).

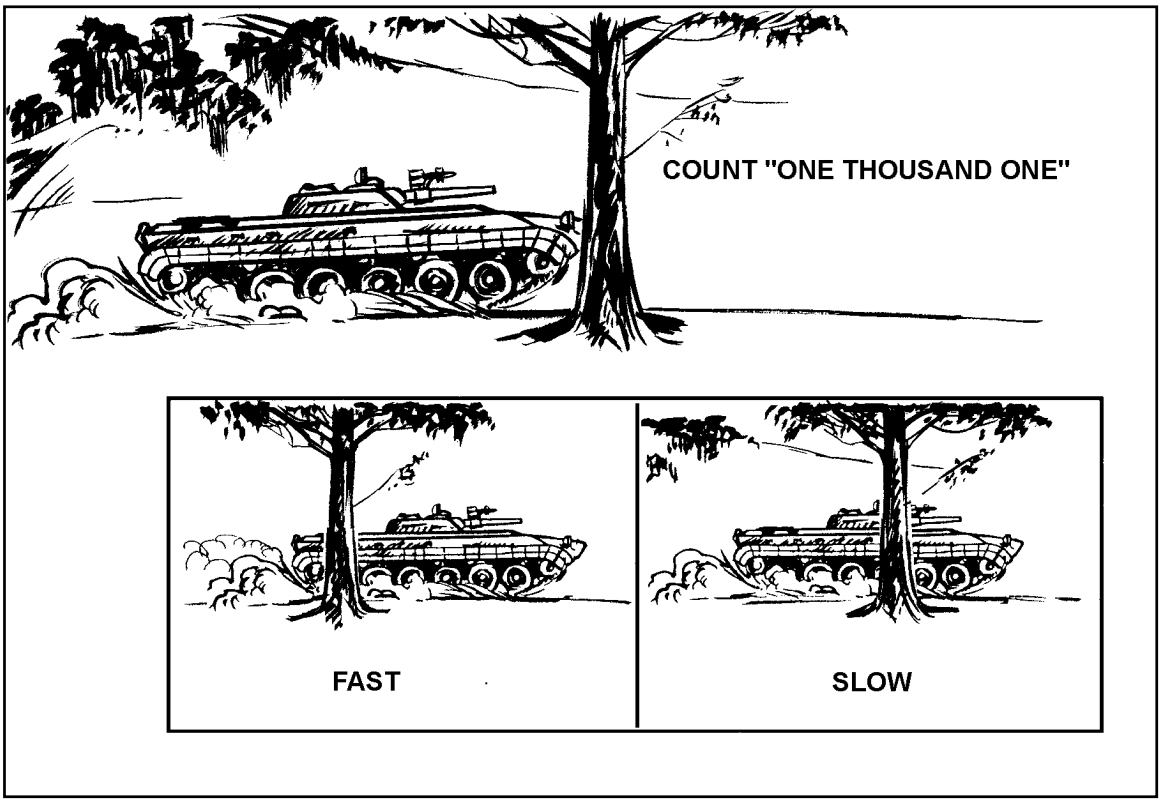


Figure 6-1. Speed estimation.

6-3. ARMORED VEHICLE WEAKNESSES

Armored vehicles usually have their heaviest armor in front, because they are designed mainly for offensive operations against other armored vehicles (Figure 6-2). All vehicles are vulnerable to repeated hits on their flanks and rear, though the flank offers the largest possible target. Firers should always aim center of mass to increase the probability of a hit. The older the vehicle model, the less protection it has against antiarmor weapons. Consequently, newer versions may use bolt-on (applique) armor to improve their survivability. Some vehicles are equipped with reactive armor, which consists of metal plates and plastic explosives. Reactive armor usually covers the forward-facing portions and sides of the vehicle and can defeat shaped-charge weapons such as the LAW and AT4. When reactive armor detonates, it disperses metal fragments to 200 meters. The M72-series LAW and the M136 AT4 cause only a small entry hole in an armored vehicle target, though some fragmentation or spall may occur.

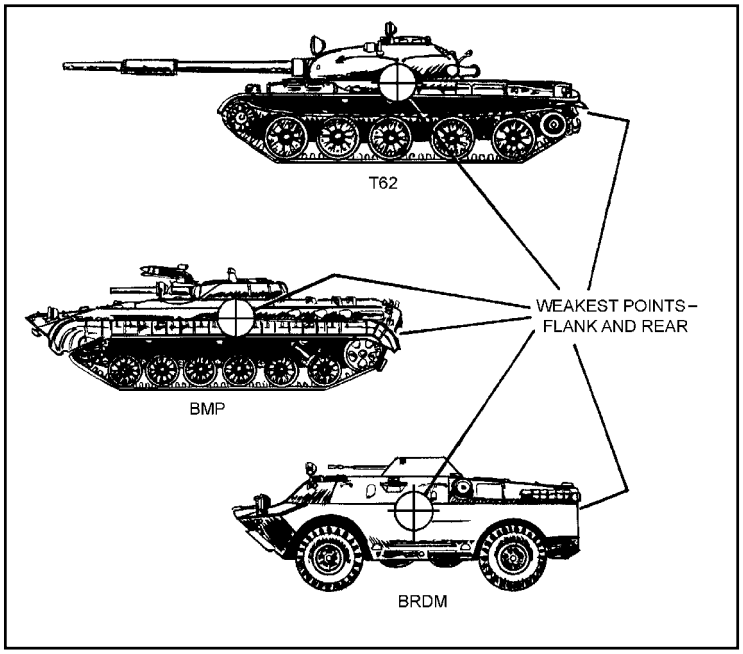


Figure 6-2. Armored vehicle weak points.

a. Natural or man-made obstacles can be used to force the armored vehicle to slow, stop, or change direction. This pause enables the firer to achieve a first-round hit. If he does not achieve a catastrophic kill on the first round, he or another firer must be ready to engage the target vehicle immediately with another round.

b. An armored vehicle without close protection (dismounted infantry) in woods, MOUT, or other restrictive terrain is vulnerable to close attack. This type of attack is most likely to originate from well-armed infantry-type teams organized into armor-killer teams. (Noninfantry units may also be required to perform this mission.) Skilled firers from these teams should engage the suspension or engine compartment of vehicles that have applique or reactive armor. When an armored vehicle is buttoned up—all hatches are closed and personnel are inside the vehicle—the crew cannot see well enough to protect itself from close attacks or attacks from the flanks or rear. The personnel inside cannot see anything within 10 meters of the vehicle, and they cannot shoot at anything (using their main guns) within 20 meters. The white area in Figure 6-3, page 6-4 shows the most favorable direction of attack when the turret is facing to the front; the gray area shows the vehicle's principal direction of fire and observation when the turret is facing to the front.

c. Armored vehicle kills are classified according to the level of damage achieved (Table 6-1).

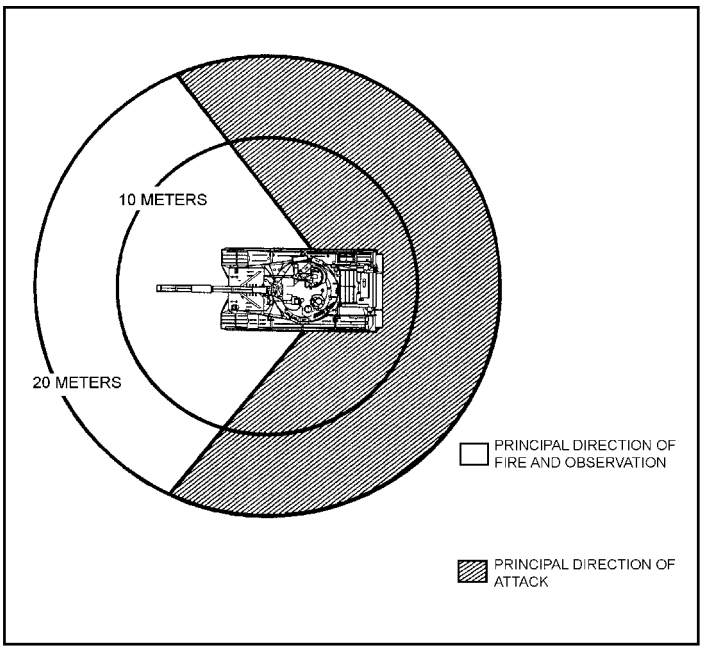


Figure 6-3. Limited visibility of armored vehicles.

TYPE OF KILL	PART OF VEHICLE DAMAGED OR DESTROYED	CAPABILITY AFTER KILL
Mobility Kill	Suspension (track, wheels, or road wheels) or power train (engine or transmission) has been damaged.	Vehicle cannot move, but it can still return fire.
Firepower Kill	Main armament has been disabled.	Vehicle can still move, so it can get away.
Catastrophic Kill	Ammunition or fuel storage section has been hit by more than one round.	Vehicle completely destroyed.

Table 6-1. Armored vehicle kills.

6-4. METHODS OF ENGAGEMENT

The four engagement methods include single, sequence, pair, and volley firing. The leader evaluates the situation on the ground to determine which of these methods to use. Regardless of whether they are used singly or in combination, communications are needed as well. The methods of engagement are rehearsed IAW unit SOP.

a. **Single Firing**. A single soldier with one light antiarmor weapon may engage an armored vehicle, but this is not the preferred method of engagement. Several light antiarmor weapons are required to kill an armored vehicle. A single firer firing one round must hit a vital part of the target to damage it at all (Figure 6-4).

(1) ***Range Not Known***. A single firer should engage only targets within 200 meters when he does not know the actual range. The probability that he hits a target beyond 200 meters with a single round is small.

(2) ***Range Known***. A single firer can engage targets out to 225 meters with the LAW or 300 meters with the AT4 when he knows the actual range. The firer should do this only when he has a flank or rear shot, or when he has no other engagement option.

Figure 6-4. Single firing.

b. **Sequence Firing**. A single firer, equipped with two or more light antiarmor weapons prepared for firing, engages the target. After engaging with the first round and observing the impact, the firer adjusts his point of aim, engages with another round, and so on until he destroys the target or runs out of rounds (Figure 6-5).

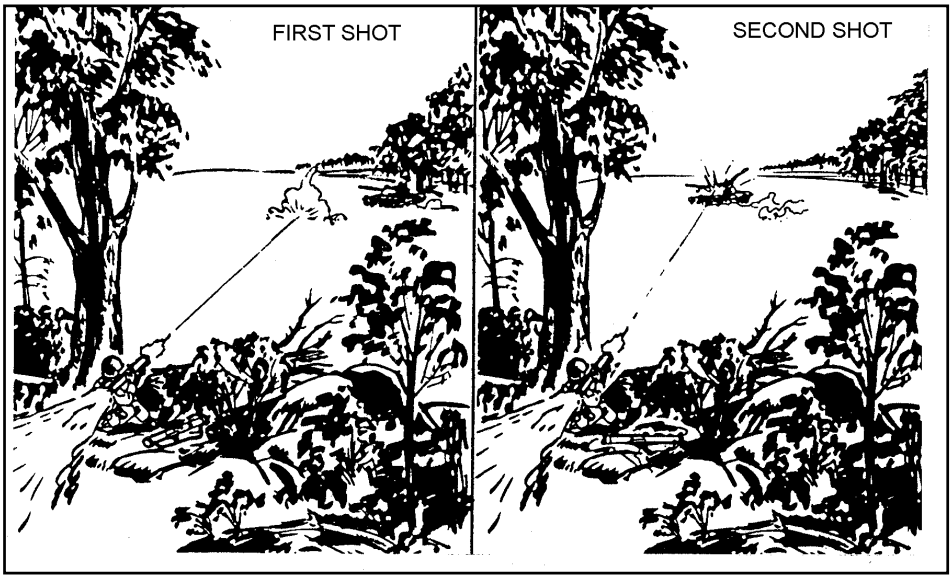


Figure 6-5. Sequence firing.

c. **Pair Firing**. Two or more firers, equipped with two or more light antiarmor weapons prepared for firing, engage a single target. Before firing, the first firer informs the others of the estimated speed and distance to the target. If the impact of his round proves his estimate to be correct, the other firers engage the target until it is destroyed. If the impact of the round proves his estimate to be incorrect, the second firer informs the others of his own estimate, then he engages the target. This continues until the target is destroyed or all rounds are expended (Figure 6-6).

FIRST SHOT
BMP, 150 METERS, FAST
LOOKS LIKE HIS RANGE WAS CORRECT, BUT THE BMP IS GOING SLOWER
SECOND SHOT
RANGE CORRECT, SPEED SLOW
1ST GUNNER PREPARES TO FIRE THIRD ROUND

Figure 6-6. Pair firing.

d. **Volley Firing**. Two or more firers can engage a single target when the range is known. These firers engage the target at one time on a prearranged signal such as a command, whistle, booby trap, mine, or TRP. For the best method of engagement, use the light antiarmor weapon, because it places the most possible rounds on one target at one time, increasing the possibility of a kill (Figure 6-7).

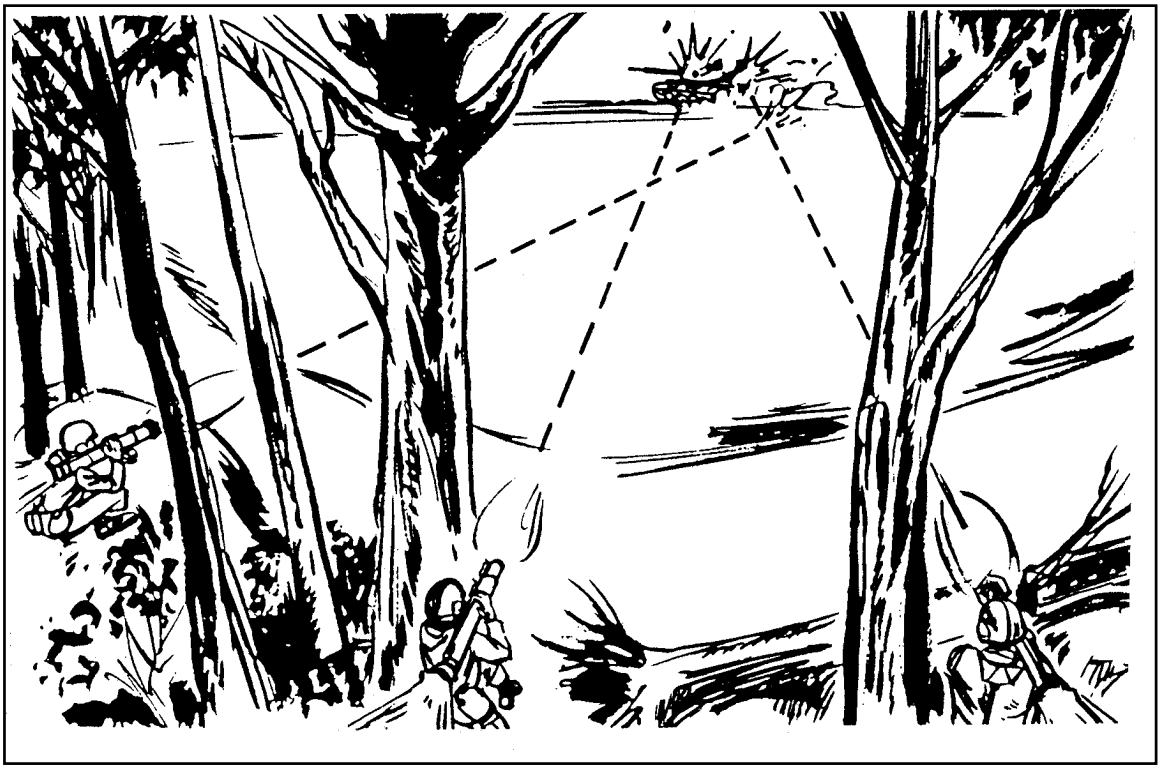


Figure 6-7. Volley firing.

e. **Communications**. Leaders control all unit fire and communicate this information to the entire unit IAW unit SOP. Light antiarmor weapons firers must know—

- Designated firers.
- Target priority.
- Method of engagement.
- Range and lead to target (if known).
- Command or signal to fire.
- Command or signal to cease fire.

6-5. ENGAGEMENT OF FIELD FORTIFICATIONS AND BUILDINGS

Light antiarmor weapons have little effect against field fortifications and buildings. Soldiers should not expect to severely damage targets with these weapons. However, if the alternatives shown in Table 6-2, page 6-8, are used, soldiers may be able to gain a temporary advantage.

6-6. ENGAGEMENT OF OTHER VEHICLES

The M72-series LAW proves more effective against light vehicles; the M136 AT4 proves more effective against armored vehicles. Nonarmored vehicles, such as trucks, cars, and boats, are considered *soft targets*. Firing along their length offers the greatest chance of a kill, because this type of shot is most likely to hit their engine block or fuel tank.

AIM POINT	EFFECT WHEN WEAPON IS FIRED AT AIM POINT	RECOMMENDED FIRING TECHNIQUE
BUNKER OR FIGHTING POSITION		
Firing Port or Aperture	Rounds fired into firing ports or apertures are wasted: rounds detonate inside rear of position, causing little structural damage to the position or to the equipment or personnel within, unless they are hit directly. The AT4 produces less effect than the LAW.	Coordinate fire: Fire *light antiarmor weapons* at a point 6 to 12 inches from the front edge of the firing ports in the berm. Fire *small arms* at the bunker or position to prevent personnel within from returning light antiarmor fire.
Berm	Firing at the berm causes the round to detonate outside the fighting position or inside the berm, creating only a small hole in the berm, dust, or minor structural damage to the position, but no damage to personnel or equipment unless they are hit directly. The AT4 produces less effect than the LAW.	
Window	The round may travel completely through the structure before detonating; if not, it creates dust and causes minor structural damage to the rear wall, but little damage to personnel or equipment, unless they are hit directly. The AT4 produces *less* effect than the LAW.	Fire 6 to 12 inches from the sides or bottom of a window. Light antiarmor rounds explode on contact with brick or concrete, creating an opening whose size is determined by the type of round used.
Wall	The round detonates on contact, creating dust and causing a small hole and minor structural damage, but little damage to personnel or equipment, unless they are hit directly. The LAW may be used to create a loophole, which is a hole large enough to throw hand grenades through. The AT4 produces *less* effect than the LAW.	
Corner	Corners are reinforced and thus harder to penetrate than other parts of a wall. Any light antiarmor round will detonate sooner on a corner than on a less dense surface. Detonation should occur in the targeted room, creating dust and causing *overpressure*, which can temporarily incapacitate personnel inside the structure near the point of detonation. The AT4 causes *more* overpressure than the LAW.	

Table 6-2. Effects of light antiarmor weapons on field fortifications or bunkers.

6-7. LIMITED VISIBILITY ENGAGEMENTS

Limited visibility engagements can be conducted using various night vision devices or with artificial illumination. However, when NVDs or artificial illumination is used, limited visibility can reduce the maximum effective range for light antiarmor weapons by at least one-third. To avoid fratricide, leaders must ensure all designated light antiarmor weapon firers are trained to use their weapons in limited visibility.

a. **Night Vision Device**. Before a NVD can be used with the M136/AT4, it must be removed from its designated weapon (M249 machine gun or automatic weapon, or M60 machine gun) and the M136/AT4 mounting bracket must be attached. Appendix F describes the various NVDs that can be used, it also gives information for mounting, boresighting, and zeroing procedures for each NVD.

b. **Artificial Illumination**. If artificial illumination is used during a limited visibility engagement, it should be placed above and slightly beyond the target. However, the ability to identify and engage targets is even less with artificial illumination than with NVDs.

6-8. ENGAGEMENT IN NBC CONDITIONS

Wearing a protective mask limits the firer's ability to sight the weapon. Wearing NBC gloves limits his ability to manipulate the firing mechanism.

a. **Sighting the Weapon**. Sighting while wearing the protective mask may require rotating the weapon slightly counterclockwise. The mask also makes determining the location, identity, and engageability of targets more difficult.

b. **Firing the Weapon**. Practice manipulating the firing mechanism while wearing NBC gloves.

NOTE: When live firing either a light antiarmor weapon or its subcaliber trainer, aim within range firing limits.

DANGER

THE M136 AT4 IS NOT RATED SAFE. IN TRAINING, NEVER FIRE IT FROM AN ENCLOSURE; IN COMBAT, DO SO ONLY WHEN NO OTHER POSITION IS AVAILABLE. THE OVERPRESSURE AND BLAST COMBINED CREATE CONDITIONS THAT CAN KILL YOU. IF THEY DON'T KILL YOU, THEY CAN INJURE YOU SERIOUSLY OR DEAFEN YOU TEMPORARILY OR PERMANENTLY.

6-9. ENGAGEMENT FROM AN ENCLOSURE

Firing from an enclosure creates unique hazards. As such, before positioning soldiers in enclosures (in combat only), leaders must consider several factors that affect safety. Only in combat, *when no other tactical option exists*, should the M136 AT4 be fired from an enclosure. If it must be employed this way, the enclosure must meet the following minimum requirements. The M72-series LAW has been rated as safe for use from an enclosure but, again, only when the enclosure meets the following minimum requirements:

a. **Construction**. The building must be sturdily constructed to reduce the structural damage that would occur in a weakly constructed enclosure such as one made of wood or stucco.

b. **Size of Enclosure**. Minimum measurements for the enclosure are as follows:

- AT4—minimum room size 17 x 24 feet.
- LAW—minimum room size 12 x 15 feet.
- Both—minimum ceiling height 8 feet.

c. **Ventilation to the Rear and Sides**. To allow for the backblast, at least 20 square feet of ventilation—such as a standard 3-foot by 7-foot doorway—must be provided directly behind the firer. More doors and windows are removed beside and behind the position to increase ventilation and reduce overpressure, noise, and blast effects. Without sufficient ventilation, the blast would weaken or collapse the walls. On the front wall, windows and doors are reinforced rather than removed, because removing would draw attention to the position. Reinforcing the windows also helps protect the firer from enemy direct-fire weapons.

d. **Objects and Debris**. All objects and debris are removed from the rear of the weapon, because the backblast causes them to fly around the room injuring personnel.

e. **Muzzle Clearance**. Muzzle Clearance must be at least 6 inches.

f. **Weapon Clearance**. Properly positioning the weapons within the enclosure is vital to the safety and survival of all personnel in the enclosure. The weapons should be positioned so that no walls are within 5 meters to the rear or side of the weapon.

g. **Personnel Positions**. If any other soldiers must be present, then they must remain forward of the rear of the launcher and avoid standing in corners or near walls. If possible, they should construct reinforced positions that fit the previous criteria and that can protect them in case the building collapses.

WARNING

To avoid injuring the eardrums, soldiers must wear the approved brand of ear protection.

6-10. ENGAGEMENT BEYOND MAXIMUM EFFECTIVE RANGE (M136 AT4 ONLY)

A skilled M136 AT4 firer can engage targets beyond the weapon's maximum effective range of 300 meters, up to 550 meters. Beyond 550 meters, the firer must aim higher than center of mass and apply additional lead for moving targets. Commanders must realize that accuracy is reduced at these ranges. Also, firing at these ranges identifies the firing position to the enemy.

6-11. OFFENSIVE OPERATIONS

All elements, even those with other organic antiarmor weapons, use light antiarmor weapons. Light antiarmor weapons can influence the action in an attack, so units should routinely stock them beforehand. They are most useful against lightly armored vehicles. They can also be used against soft targets, such as bunkers, field fortifications, automobiles, and trucks, but their shaped-charge warheads have less effect on these than

on armored targets. Unless personnel, ordnance, or flammable material on or inside them are hit, soft targets can normally continue to fight after being attacked by light antiarmor weapons. Due to their relatively short range, light antiarmor weapons should be placed throughout the attacking force. They support the maneuver by providing a base of fire, and they enable the assaulting force to engage in close antiarmor combat.

6-12. DEFENSIVE OPERATIONS

Whether or not other organic antiarmor weapons are available, light antiarmor weapons are an asset in the squad and platoon defensive plan.

a. Light antiarmor weapons are employed with interlocking fires to provide mutual support. Dispersion allows leaders the flexibility to place flank, rear, and oblique fires on targets. This procedure increases the survivability of the firers as well as the probability of achieving kills. Leaders must select positions that avoid fratricide from antiarmor backblast and short rounds (Appendix A).

b. The squad and platoon leader's sector sketch identifies TRPs and primary areas of possible engagement. The sector sketch also identifies possible avenues of approach for enemy armored vehicles. Each light antiarmor weapon shares a sector of fire with the primary small-arms weapon assigned to its position. However, because it is neither a primary nor crew-served weapon, the light antiarmor weapon does not require a separate range card. When assigning sectors of fire, squad and platoon leaders inform firers of all possible target areas, TRPs, and prearranged signals (Figure 6-8). (FMs 7-7, 7-7J, and 7-8 provide more information about the squad and platoon sector sketch.) Leaders provide each designated position with two or more light antiarmor weapons.

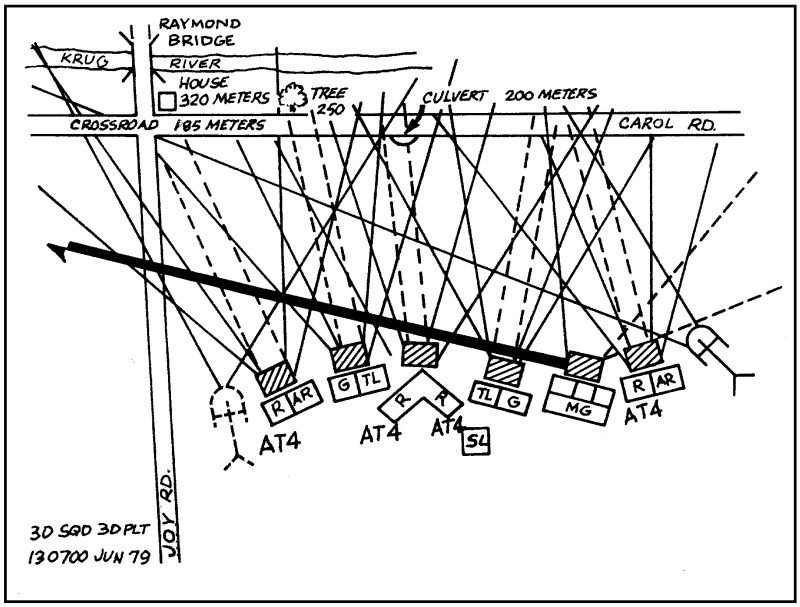


Figure 6-8. Squad sector sketch.

6-13. OTHER TACTICAL OPERATIONS

The weight of the light antiarmor weapon suits it well for combat patrols and rear area operations. (FM 7-8 provides more information about these subjects.)

a. **Combat Patrols**. Light antiarmor weapons are used on combat patrols to destroy enemy equipment, installations, and key points, and to harass enemy forces. The two types of combat patrols are—

(1) ***Ambushes (Antiarmor)***. The commander can employ armor-killer teams either during limited visibility or when cover, concealment, and withdrawal routes are available. The key to ambushing armored or other vehicles is to choose terrain that restricts their maneuverability and fields of fire, but that allows friendly forces to engage the vehicles from the flank and rear. Soldiers can emplace antipersonnel mines before the ambush so that dismounting enemy soldiers deploy into them. Though light antiarmor weapons can be used independently, they are normally used in support of designated organic antiarmor weapons such as the Dragon. Volley firing light antiarmor weapons increases the probability of a quick kill (Figure 6-9). Security teams stop the enemy from escaping.

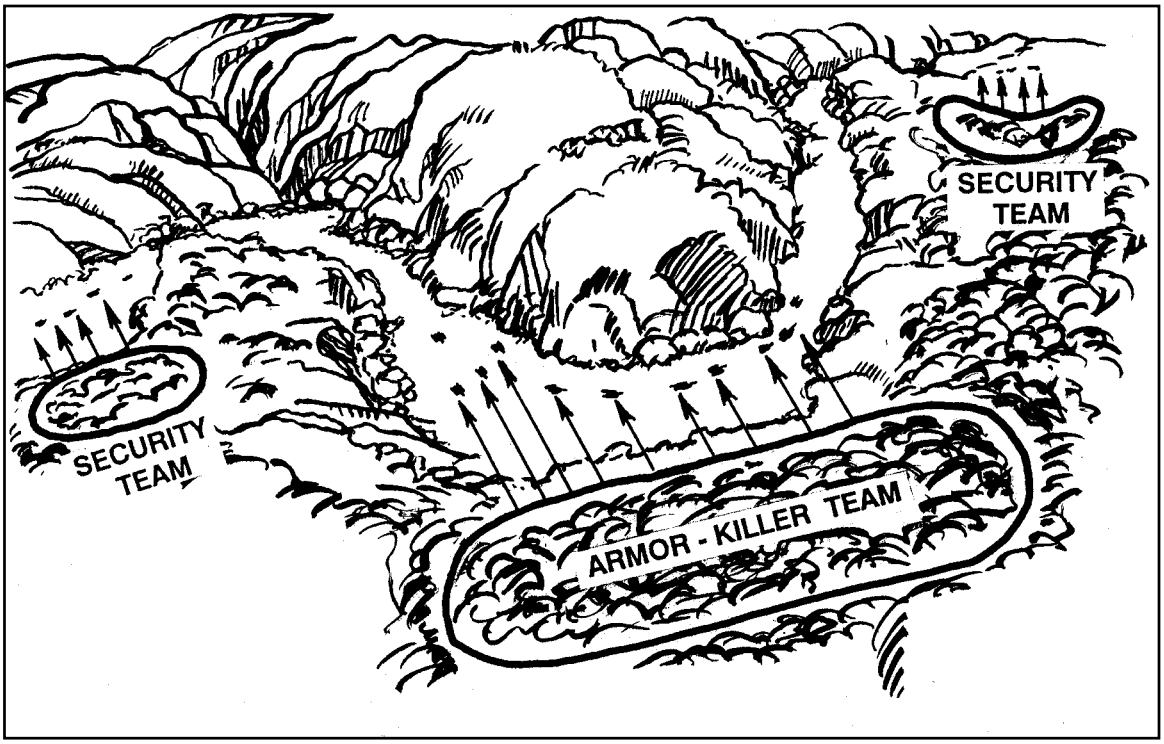


Figure 6-9. Antiarmor ambushes.

(2) ***Raids***. Using light antiarmor weapons on raids increases target options. Light antiarmor weapons can also be used to defend against armored vehicles.

b. **Rear Area Operations**. Rear area operations usually consist of either: defending unit trains and tactical operation centers, or patrolling rear areas.

(1) ***Defense of Tactical Operations Center and Unit Trains***. The mobility of modern vehicles makes the TOC and unit trains prime targets. Light antiarmor weapons are used to engage vehicles threatening the unit during the defense of the TOC. Soldiers who use light antiarmor weapons in this type of operation normally perform noninfantry-type roles. Unit leaders designate soldiers to carry light antiarmor weapons and ensure that these soldiers receive light antiarmor weapons training.

(2) ***Patrols of Rear Areas***. Rear area patrols are security patrols conducted by designated infantry or MP units. These patrols can react to any threat they encounter in the rear area. Rear area patrols use the light antiarmor weapon in a hasty point defense at a roadblock, intersection, or strongpoint.

CHAPTER 7
TRAIN-THE-TRAINER AND UNIT TRAINING PROGRAMS

During initial-entry training, soldiers receive only an orientation for each of the light antiarmor weapons. When they arrive in a unit, soldiers should train to Skill Level 1 proficiency on all assigned weapons and equipment. Each unit should have an ongoing unit training program to allow soldiers to work together to attain and sustain their skills. This program integrates individual and collective tasks. Operating a unit training program requires the unit to also maintain a train-the-trainer program. Both programs are planned and conducted IAW the commander's METL.

7-1. TRAINING STRATEGY

Training strategy integrates resources into a year-round program to train the individual and collective skills needed to perform the wartime mission. Thus, units are trained to fight and win on the battlefield. The training strategy includes institutional and unit training.

a. **Institutional Training**. TRADOC schools conduct institutional training. These courses train critical individual and leader skills required to succeed in combat. Students are provided the latest doctrine and taught current technical skills associated with the light antiarmor weapons available within the Army. Soldiers train at several institutional schools throughout their career (see the appropriate programs of instruction [POIs]) (Table 7-1).

ENLISTED	Initial-Entry Training
	Primary Leadership Development Course
	Basic Noncommissioned Officer Course
	Advanced Noncommissioned Officer Course
OFFICERS	Precommission Training
	Officer Basic Course
	Officer Advanced Course

Table 7-1. Institutional training.

b. **Unit Training**. Unit training consists of sustainment training in individual and collective skills. Commanders manage their resources (devices, simulators, simulations, ranges, and ammunition) carefully to best develop individual and leader skills. Through the use of exercises, (drills, STXs, and qualification tables), the unit develops skills and integrates individuals into a cohesive crew or squad. Table 7-2 provides a training guide for building a light antiarmor weapons sustainment training plan (see also Appendixes C and E).

7-2. UNIT TRAINING PROGRAM

Every unit commander, including those commanding CS and CSS units, should develop a program for light antiarmor training. Some units have more than one type of light antiarmor weapon that requires sustainment training. The commander considers preparation and training for both collective and individual tasks. Trainers analyze their collective tasks and the individual tasks that support them. Individual tasks must be integrated into collective training and rehearsals. The units should try to train light antiarmor weapons at the same time and on the same range (Appendix D). Otherwise, these weapons are trained in alternating quarters of the year.

a. **Sustainment Training Requirements**. Sustainment training is recommended for each soldier. Active Component units should conduct sustainment training quarterly and fire the appropriate qualification tables semiannually, depending on the STRAC TRC level. Reserve Component units should conduct sustainment training semiannually and fire the appropriate instructional or qualification tables annually. All units should fire advanced instructional tables semiannually. When possible, they should conduct live fire annually IAW the current STRAC manual. (Appendix E provides all the necessary firing tables.) Commanders should ensure that designated gunners complete unit sustainment training and live fire tactical light antiarmor weapons sometime during that quarter. *Training requirements* are divided into four tracks, A through D, based on ammunition allocations (Table 7-3). Table 7-4 provides an example *training frequency chart*. This example is based on the AT4. The same tasks apply to all light antiarmor weapons, but procedures and standards may vary. Tactical weapons are allocated IAW the current standards in training commission (STRAC) manual.

1	Designated soldiers should train as often as needed to maintain proficiency.
2	Performance evaluations should be administered to designated soldiers quarterly, if resources allow.
3	Designated soldiers should fire the qualification tables semiannually for verification on designated weapons.
4	Designated soldiers qualify semiannually on their designated weapons. Qualification consists of a hands-on performance evaluation and qualification firing tables.
5	Designated soldiers should be trained in advanced *instructional* techniques as often as the unit training program allows. This training helps to maintain their target engagement skills.
6	All soldiers not designated as light antiarmor weapons gunners should train on these weapons to the extent allowed by resources.

Table 7-2. Sustainment training plan for light antiarmor weapons.

TRACK	DETERMINES ANNUAL AMMUNITION ALLOCATION FOR:
A	Each Active Component designated firer.
B	Track deleted
C	Each Reserve Component designated firer.
D	Each Reserve Component training division instructor.

Table 7-3. Training requirements.

TRAINING OBJECTIVE	TASK	FREQUENCY		APPROXIMATE TIME
		AC	RC	
NA	Conduct an orientation safety briefing (as appropriate).	Q	A	10 min
1	Inspect an M136 AT4 for serviceability.	Q	A	30 min
2	Prepare an M136 AT4 for firing.	Q	A	45 min
3	Demonstrate correct M136 AT4 firing positions.	Q	A	45 min
4	Estimate range.	Q	A	60 min
5	Determine the correct M136 AT4 sight picture.	Q	A	30 min
6	Perform M136 AT4 misfire procedures.	Q	A	45 min
7	Return the M136 AT4 to the carrying position.	Q	A	45 min
8	Engage targets with an M136 AT4.	S	B	3 1/2 hr
KEY: **Q = quarterly (every 90 days)** **S = semiannually (twice a year)** **A = annually (once a year)** **B = biennially (every two years)**				

Table 7-4. Example training frequency chart.

b. **Gunnery Training Requirements**. All designated soldiers should be trained to standard IAW the combat techniques in Chapter 6 and the performance evaluations in Appendix C.

c. **Collective Training**. Individual tasks must be integrated into collective training and rehearsals. To accomplish this, commanders analyze the collective tasks from their unit METL and the individual tasks that support the collective tasks. The commander determines the collective tasks that must be practiced by analyzing the mission outlines

in the appropriate mission training plan (MTP). The mission outlines describe the collective tasks required to execute each ARTEP mission. Leaders determine the individual tasks that support the collective tasks by referring to the mission task matrix in the appropriate MTP.

(1) Leaders use the training standards given in the appropriate manual for the individual tasks. Noninfantry units can use FMs 7-7, 7-7J, 7-8, 7-10, and 7-20 to identify infantry-type missions. Some of the tasks identified may include engaging armored vehicles. When planning training, the trainer incorporates the training devices and aids for light antiarmor weapons into the unit's training. These devices and aids add realism and allow trainer to properly evaluate the task being conducted. He must also identify deficiencies and correct them by retraining soldiers to use the selected weapons and their related training devices correctly.

(2) The MILES Viper is a force-on-force trainer for light antiarmor weapons. MILES trainers are *not* gunnery trainers and are not used for sustainment training. They are used in all force-on-force training. Table 7-5 provides an example MILES training program.

SEQUENCE	FREQUENCY (TIMES PER YEAR)	
	ACTIVE	RESERVE
Squad, platoon, or company FTX or STX	4	1
Battalion FTX	2	0
Battalion ARTEP	2	1
Total MILES training events per year	8	2

Table 7-5. MILES training program.

7-3. TRAIN-THE-TRAINER PROGRAM

The success of the unit's light antiarmor training program depends on trainers who are well-trained, competent, and prepared to train soldiers.

a. **Objectives**. The train-the-trainer program must teach trainers to do the following:
- Evaluate the unit’s training weaknesses.
- Plan training.
- Set up, operate, and maintain training equipment.
- Conduct training.
- Coach firers in gunnery training.
- Evaluate firers' training weaknesses.
- Correct firers' training weaknesses.
- Instill confidence in the firers trained.
- Maintain training records.

b. **Mission-Essential Task List**. The commander must carefully examine his unit's wartime mission and develop a METL. He must then organize the unit's sustainment training program to support the METL. The light antiarmor sustainment training plan

consists of quarterly, semiannual, and annual training events. Between these events, the unit provides additional light antiarmor weapons training. The sustainment plan should prepare the unit for the next round of weapons gunnery while also supporting the unit METL.

c. **Trainer Assessment**. Trainers within a unit are normally team, squad, and section leaders and platoon sergeants. Before becoming weapons trainers, they must be assessed carefully and any shortcomings corrected. The commander chooses a method of assessing the trainers that ensures that their abilities are accurately evaluated. Then, with the assistance of the platoon leaders and platoon sergeants, the commander performs this assessment.

d. **Command Benefits**. Regular and aggressive train-the-trainer programs provide valuable benefits that gradually spread through the unit. These benefits include a base of expertise, proficiency, and esprit de corps. Maintaining this base is easier than recreating it.

e. **Training Tasks**. Successful trainers know how to operate the training devices for the light antiarmor weapons assigned to their units. Based on the unit's METL, the commander designates the appropriate light antiarmor weapon for specified missions. Appendix C provides the tasks, conditions, and standards for each weapon discussed in this manual. The trainers must know the appropriate combat techniques for employing these weapons. They must also perform the following:

- Conduct an orientation safety briefing.
- Inspect the weapons for serviceability.
- Prepare the weapons for firing.
- Demonstrate the correct firing positions.
- Estimate range.
- Determine the correct sight picture.
- Perform the correct combat and training misfire procedures.
- Return the weapon to the carrying configuration.

APPENDIX A
SAFETY

This appendix provides safety procedures for both training and combat.

A-1. TRAINING SAFETY

Training safety for light antiarmor weapons applies to all types of ranges and training sites.

a. **Backblast**. Light antiarmor weapons have little or no recoil, because the propellant gasses escape to the rear of the weapon. This backblast can damage equipment or seriously injure personnel who are too close to the rear of the launcher. When operating temperatures fall below freezing (0NC or 32NF), all backblast areas and safety zones double.

(1) ***M72-series LAW***. This is an open-chambered weapon, so it has no recoil. The launcher's total backblast area extends 40 meters (44 yards) to the rear (Figure A-1) and is divided into two zones. During training, both should be marked off limits:

(a) Danger zone. All personnel, equipment, and flammable material must be clear of this area.

(b) Caution zone. The weapon's backblast may throw loose objects to the rear. Therefore, personnel must also stay clear of this area.

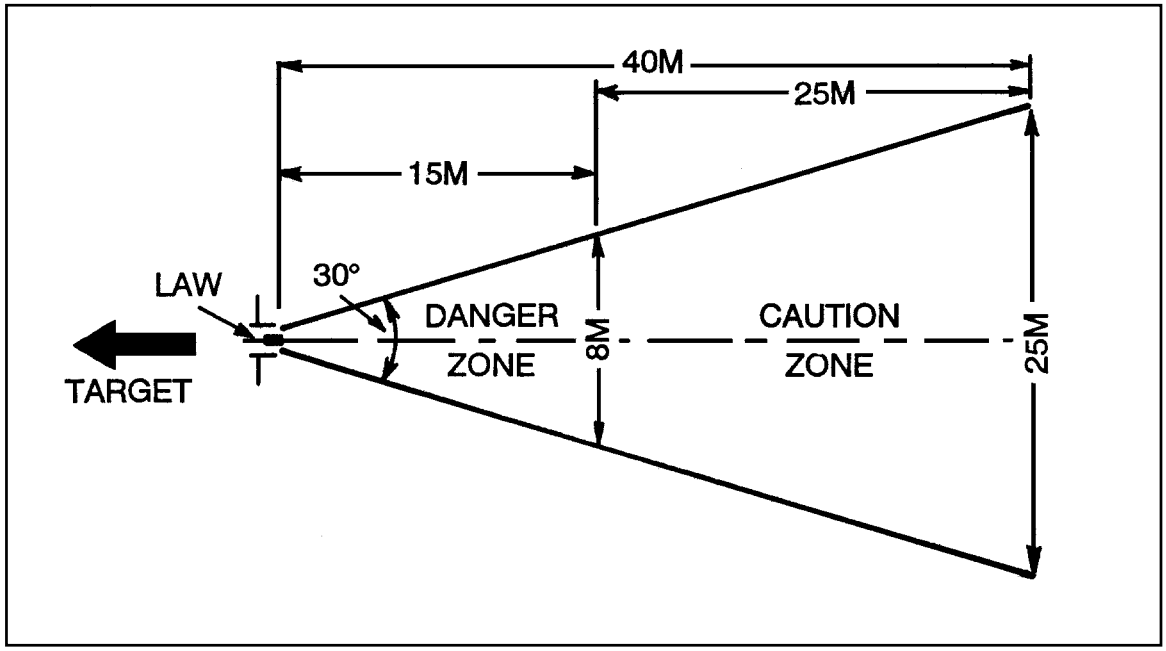


Figure A-1. M72-series LAW backblast area.

(2) ***M136 AT4***. Because the AT4 has a closed chamber, it has a slight recoil. When the weapon is fired, pressure builds up in the chamber and ruptures the baseplate. Once the baseplate ruptures, gasses exit from the back of the weapon, forming the backblast. The total backblast area extends 100 meters to the rear of the launcher in a 90-degree fan (Figure A-2, page A-2). During training, the *entire* backblast area should be marked off limits and kept clear of personnel and equipment. In combat, personnel may remain to the rear of the

weapon, but *only* if they are in protected positions. Backblast heat or flying debris could injure the firer and other soldiers anywhere in the backblast area. This weapon must not be fired from an enclosure or in front of a barrier (TM 9-1315-886-12). It may be fired from an enclosure in combat *only when* no other tactical option exists.

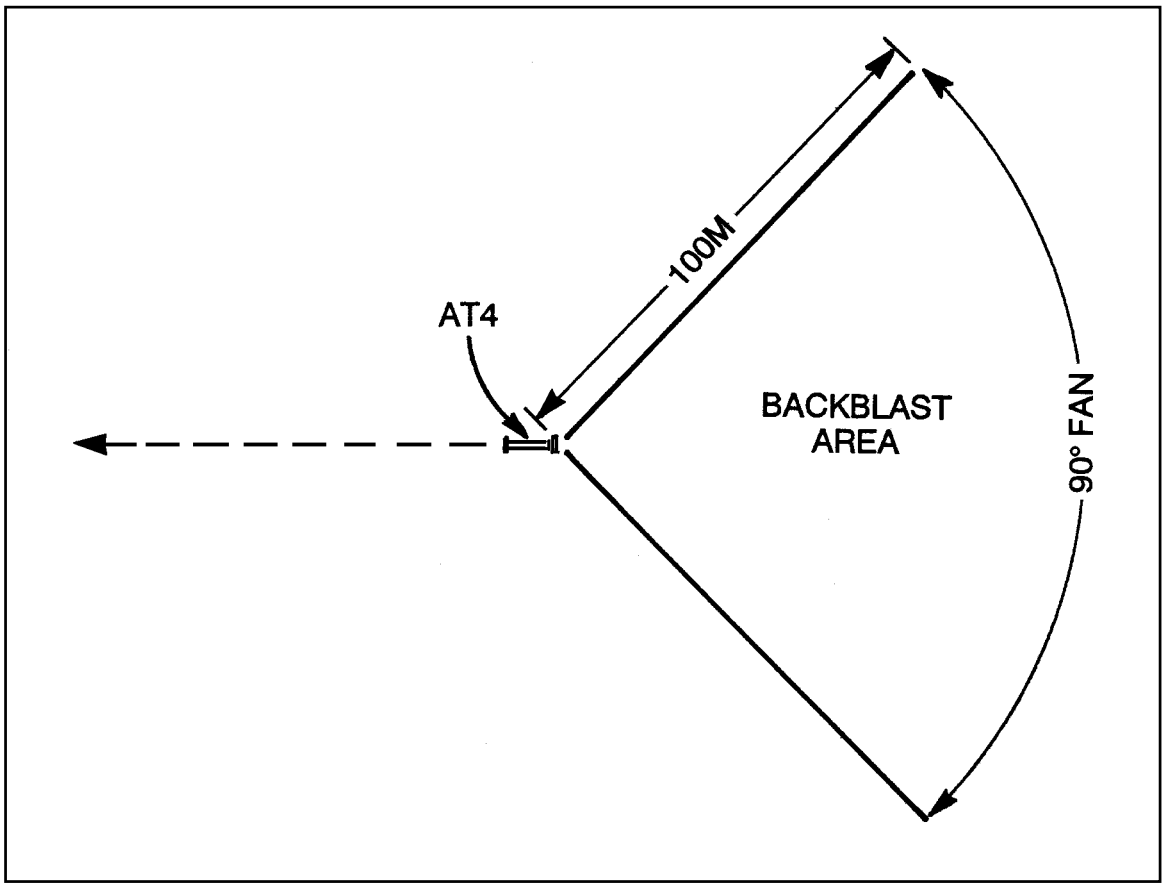


Figure A-2. M136 AT4 backblast area.

b. **Firing Limitations**. Trainers and soldiers must observe the backblast danger zones as well as other firing limitations. A light antiarmor weapon can be fired from the standard infantry fighting position. However, if this position is chosen, trainers/soldiers must consider other factors that increase the accuracy and reduce the danger to friendly soldiers: Rear of launcher extends beyond the back wall of the position, no overhead cover extends into the backblast area, and at least 1/2 meter (18 inches) clearance is around the weapon.

c. **Range Procedures for Light Antiarmor Weapons**. For all the light antiarmor weapons discussed in this manual, these procedures must be followed:

(1) The whole backblast area must be well marked and must be clear of all personnel, equipment, and flammable materials.

(2) No one enters the area behind the firing line or forward of the rear safety line without permission from the range OIC or safety NCO.

(3) Weapons are stored to prevent exposure to the sun or extreme temperatures.

d. **Additional Range Procedures for the M136 AT4**. The extreme overpressure and noise created when this weapon is fired require special precautions during training. Not only must firers and others present wear earplugs, but they may only use the approved brand—no

other brand provides sufficient protection. To reduce these hazards, the range firing limitations shown in Table A-1 must be followed.

Within a 24-hour period, a soldier may only fire, observe fire, or act as safety NCO for the M136 AT4 one to three times, depending upon the firing position used	3 times (total) if the AT4 is fired from either the standing or kneeling position _____ OR _____ 2 times if the AT4 is fired from the sitting position _____ OR _____ 1 time (total) if the AT4 is fired from either the prone or the fighting position

Table A-1. M136 AT4 firing limitations during training.

DANGER

DURING TRAINING, DO NOT FIRE LIGHT ANTIARMOR WEAPONS FROM ANY ENCLOSURE OR FROM BEHIND ANY BARRIER.

A-2. COMBAT SAFETY

Combat safety rules and procedures include all those that apply to training plus the following:

a. **Fighting Position**. Both the M72-series LAW and the M136 AT4 can be fired from the standard infantry fighting position. However, to increase accuracy and reduce the danger to friendly soldiers, the area to the rear of the firing position must have no walls, large trees, or other obstructions within 5 meters (5 1/2 yards) to deflect the backblast onto the firer or into the position.

DANGER

ENSURE THE AREA TO THE REAR OF THE FIRING POSITION HAS NO WALLS, LARGE TREES, OR OTHER OBSTRUCTIONS WITIN 5 METERS (5 1/2 YARDS). OBSTRUCTIONS DEFLECT BACKBLAST ONTO THE FIRER OR INTO THE POSITION, INJURING OR KILLING THE FIRER AND ANY OTHER SOLDIER OCCUPYING THE FIRING POSITION.

(1) In the *individual infantry fighting position*, the soldier must lean against the rear wall and ensure that the venturi or the rear of the weapon protrudes past the rear of the position. The firer's elbows are not supported.

(2) In the *two-soldier infantry fighting position*, the nonfiring soldier must remain clear of the backblast area. These positions should be constructed and sited so that none are located in another's backblast danger zone.

(3) A *modified firing position* may be constructed to the side of the two-soldier fighting position. Firing from a modified position reduces the possibility of injury to the firer or another soldier in the fighting position, but it offers the firer some protection from enemy return fire.

b. **Temperature Limitations**. No light antiarmor weapon should be fired when its temperature exceeds operating limits. When a weapon temperature is below freezing (0 degrees Centigrade or 32 degrees Fahrenheit), overpressure increases and prevents some of the propellant from burning. Then, as the projectile leaves the launch tube, portions of the remaining propellant could be directed onto the firer's face or upper body. Consequently, in cold weather, the firer should wear a protective mask. On the other hand, when the weapon temperature is above 60 degrees Centigrade (140 degrees Fahrenheit), propellants and warhead compounds can destabilize, so, whether they are located at training sites or fighting positions, weapons should be stored in a shaded area in hot weather. Finally, weapons must not be fired when their temperatures exceed safe operating limits: -40 degrees to 60 degrees Centigrade (-40 degrees to +140 degrees Fahrenheit).

c. **Minimum Target Engagement Ranges**. In combat, no targets will be engaged within the 10-meter minimum arming range. During training, no targets will be engaged within 30 meters.

d. **Overhead Fire**. Light antiarmor weapons must not be fired over the heads of friendly soldiers, unless the soldiers have adequate protection against direct impact or other hazards.

APPENDIX B

TRAINING DEVICES AND AIDS

Training devices and training aids enable soldiers to learn as much as they can about a weapon before they try the real thing. This procedure saves money and time, and it prevents injuries. ***Training devices*** *both look and behave like the real weapon, but are cheaper and safer to practice with.* ***Training aids*** *include anything else used to help soldiers learn to use a weapon. Trainers should use their imaginations and invent or adapt other training aids from available resources.*

B-1. LAW SUBCALIBER TRAINING DEVICE

The only M72-series LAW training device designed for individual use is a subcaliber trainer (Figure B-1). This device, referred to as the M190 subcaliber launcher, is made by adding an M190 subcaliber conversion kit (NSN 1340-00-420-7999) (Figure B-2) to an expended M72-series LAW launcher. It is used to fire the M73 subcaliber (35-mm) rocket. This 36-mm rocket is shorter and lighter than the LAW's 66-mm tactical rocket. It simulates the tactical rocket's smoke and flight trajectory but with less noise and backblast. The expended launcher is likely to wear out before the subcaliber inner tube does. When this happens, the inner tube can be transferred to another expended launcher. The M190 subcaliber launcher can be used in all training phases, from a fixed firing line to simulated tactical situations such as a squad live-fire exercise.

NOTE: The local Training Support Center (TSC) can install the conversion kits, but DOD Regulation 5100.76-M requires that all sensitive conventional arms, ammunitions, and explosives, including expended launchers, be carefully controlled.

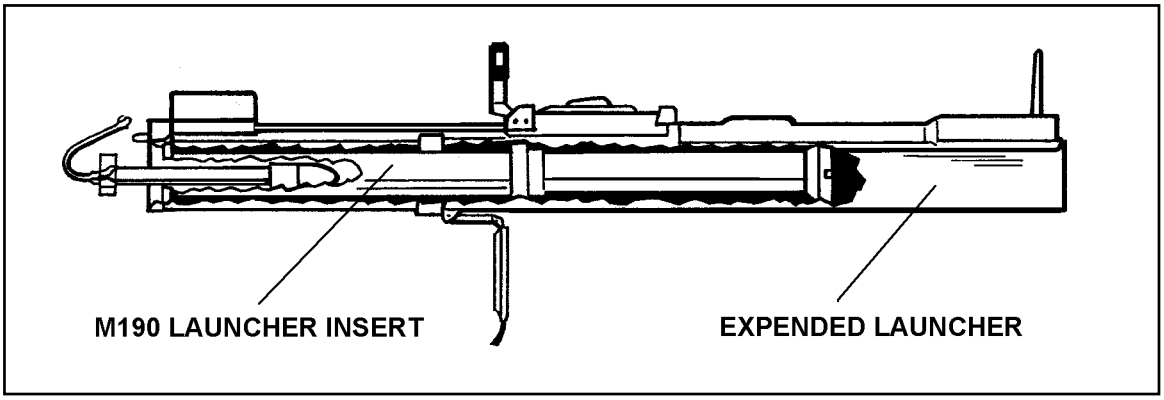


Figure B-1. LAW subcaliber trainer.

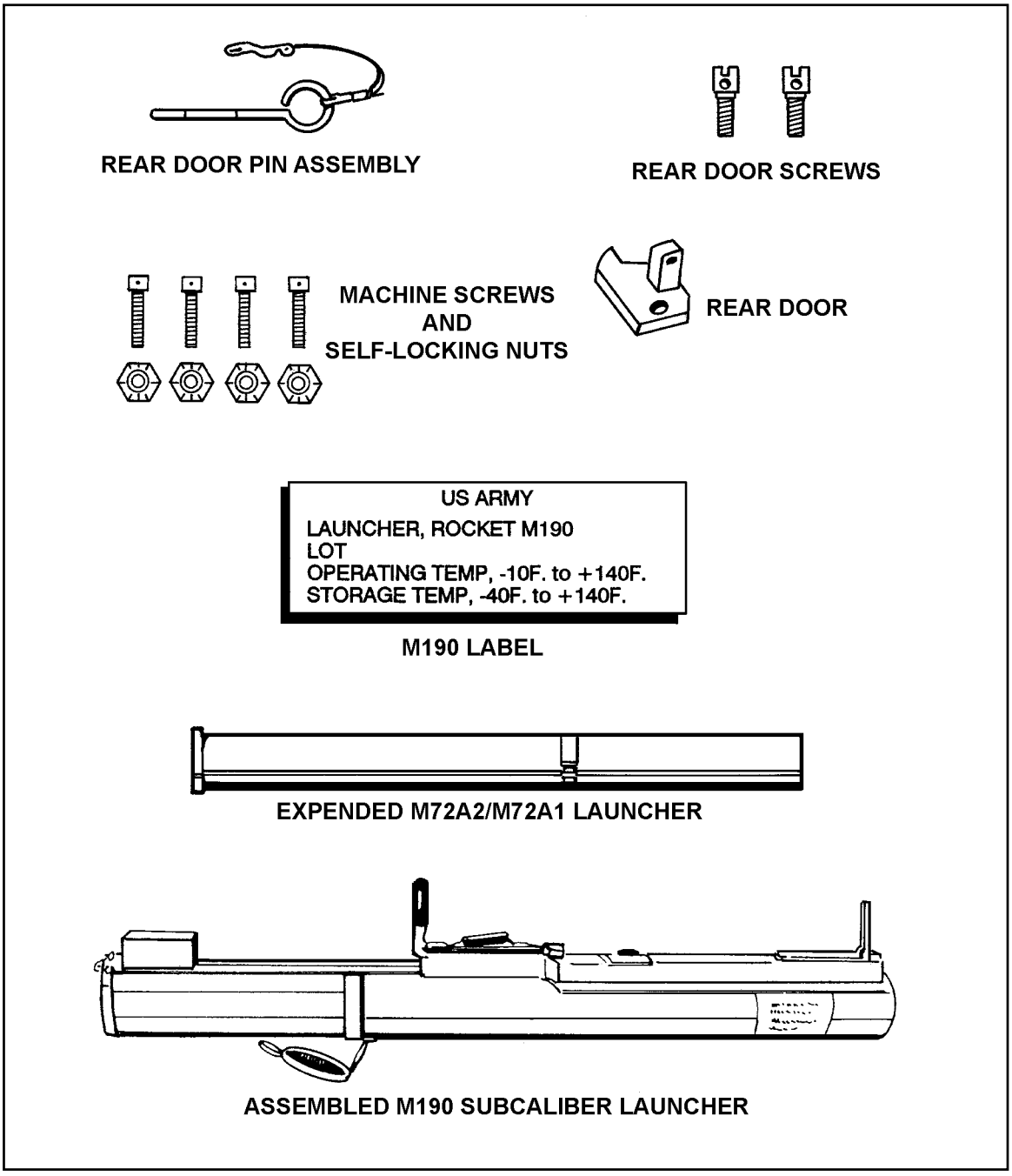


Figure B-2. M190 subcaliber conversion kit.

a. **Technical Data.**

(1) Technical data for the M73 35-mm subcaliber practice rocket are as follows:

Length	22.48 cm (8.86 inches)
Diameter	3.51 cm (1.38 inches)
Weight	154 grams (5.39 ounces)
Range	10 to 250 meters (9.14 to 228.5 yards)
Propellant Charge	3 tubular grains of M7
Spotting Head Charge	05 oz (1.5 grams) of composition mix M80

(2) Technical data for the assembled M190 practice rocket launcher are as follows:

Diameter of launcher	12.45 cm (4.9 inches)
Diameter of rocket tube	3.56 cm (1.4 inches)
Weight (with rocket)	2.26 kg (5.02 pounds)
Length of launcher	
Extended	89.9 cm (35.4 inches)
Collapsed	64.26 cm (25.32 inches)
Sights	Open, temperature compensating

b. **Trigger**. This is the same as for the LAW.

c. **Sights**. These are the same as for the LAW.

d. **Operation**. The LAW subcaliber training device operates the same as an M72-series LAW. After the M190 has been loaded, it may remain closed, or it can be extended and fired. Either way, the procedures are the same as those for the LAW.

CAUTION

When loading the law subcaliber trainer, ensure the rear cover is open, the sling assembly is off, and the launcher is collapsed.

e. **Loading**. To load the M73 rocket into the M190 launcher (Figure B-3)—

(1) Twist and remove the primer housing lockpin and open the primer housing door.

(2) Remove the fired primer block (if present) from the primer block cavity of the launcher.

(3) Inspect the primer block cavity for obstructions such as primer case stuck on the firing pin.

(4) Pivot and remove the safety clip from the rocket.

(5) Insert the M73 rocket into the launcher with the primer face up and toward the firing pin housing.

(6) Guide the primer block into the primer block cavity with the primer toward the front of the launcher. Close the primer housing door, insert the lockpin across the primer housing door, and twist to ensure a spring-tight fit. Ensure the primer housing door fits snugly.

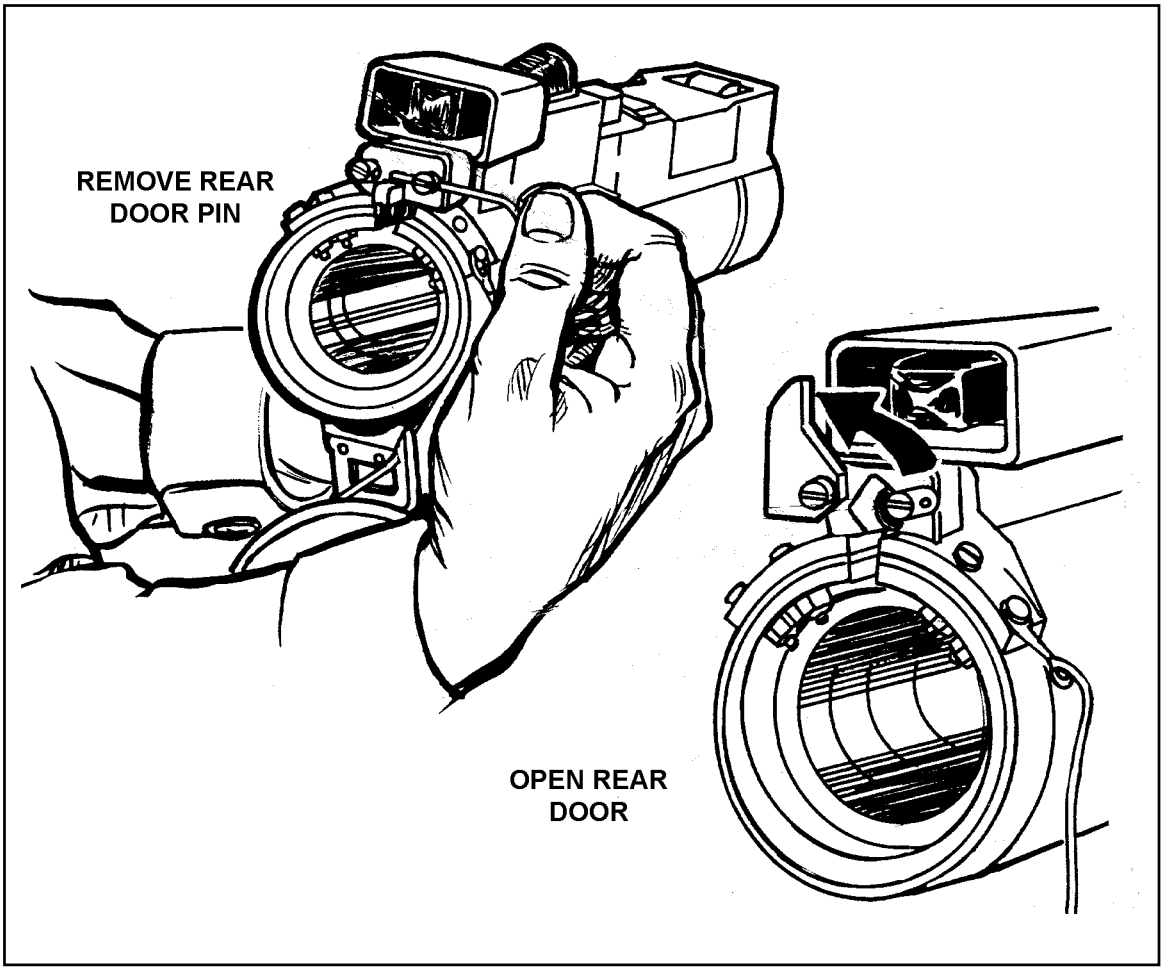


Figure B-3. Loading the LAW subcaliber launcher.

f. **Unloading**. To unload the M73 rocket from the M190 launcher—

(1) Return the arming handle to SAFE.

(2) Remove the weapon from your shoulder, keeping the weapon pointed downrange.

(3) Partly collapse the launcher, and remove the primer housing lockpin.

(4) Open the primary housing door, and remove the primer from its housing.

(5) Remove the rocket.

(6) Replace the safety clip on the rocket.

(7) Place the rocket in its original container.

g. **Function**. The M73 rocket launches the same as tactical rocket, but when the rocket head strikes the target, it sets off the spotting head that produces a flash, noise, and white smoke.

CAUTION
The M73 subcaliber rocket operates between –23 degrees and 60 degrees centigrade (-10 degrees and 140 degrees fahrenheit). Fire it only within this temperature range.

h. **Misfire Procedures**. These are the same as for the M-72 series LAW.

i. **Range Procedures and Safety**. These procedures are the same as for the LAW. The training device can be used against all solid stationary or moving targets. However, because the subcaliber rocket can penetrate 0.124 inches (0.315 cm) of steel plate or 8 inches (20.32 cm) of soft wood, the target should be constructed of 3/16-inch steel plate backed by 3/4-inch plywood.

j. **Combat Techniques**. These are the same as for the LAW.

B-2. AT4 FRONT SIGHT TEMPLATE AND TARGET SILHOUETTE SHEET

This graphic training aid (GTA 7-2-5), Sight Engagement Trainer, AT4, consists of two parts: Part 1, a front sight template, and Part 2, a target silhouette sheet. These are used together to train soldiers to obtain a correct sight picture. To obtain the correct sight picture for the target speed and range, the front sight template is placed on the target silhouette sheet as shown in Figure B-4. For each of the six targets, the reference number sheet shows the number that should appear in the circle on the front sight template. The reference number sheet is also used to determine the correct answer for any unit-developed test concerning Training Objective 12 task, Determine the Correct Sight Picture for the M136 (AT4). The local TSC can provide GTA 7-2-5.

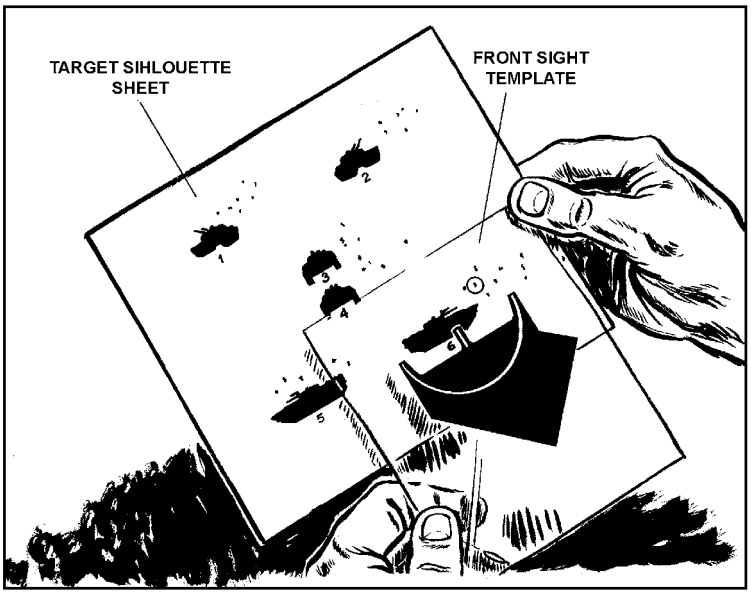


Figure B-4. Using GTA-7-2-5 with target silhouette sheet and front sight template.

B-3. AT4 FIELD HANDLING TRAINER

The AT4 field handling trainer (FHT) is an inert device made from an expended AT4 tactical launcher. It simulates the weight, balance, characteristics, and operation of the launcher. The FHT is marked with either a gold or yellow 1-inch band between the front and rear sights, and with the word "DUMMY" in 1-inch letters on the side of the launch tube. The local TSC can convert expended launchers to training devices, but DOD Regulation 5100.76-M requires that these items be carefully controlled. The FHT is appropriate for several training situations that do not require the M287 tracer trainer, which prevents unnecessary damage to the tracer trainer. The FHT is used in marksmanship training, FTXs, and institutional training to help soldiers learn how to do the following:

- Inspect the AT4 for serviceability.
- Prepare an AT4 for firing.
- Demonstrate the correct AT4 firing position.
- Perform misfire procedures.
- Return an AT4 to carrying position.

B-4. AT4 SUBCALIBER TRACER TRAINER

The M287 subcaliber tracer trainer (Figure B-5) uses the 9-mm M939 training practice-tracer (TP-T) cartridge. When loaded, this trainer simulates the AT4 in weight, balance, and operation. The velocity and trajectory of its ammunition match that of the AT4's HEAT cartridge, but the M287 produces less noise, backblast, and overpressure. The M287 subcaliber tracer trainer is used in place of the AT4 in training.

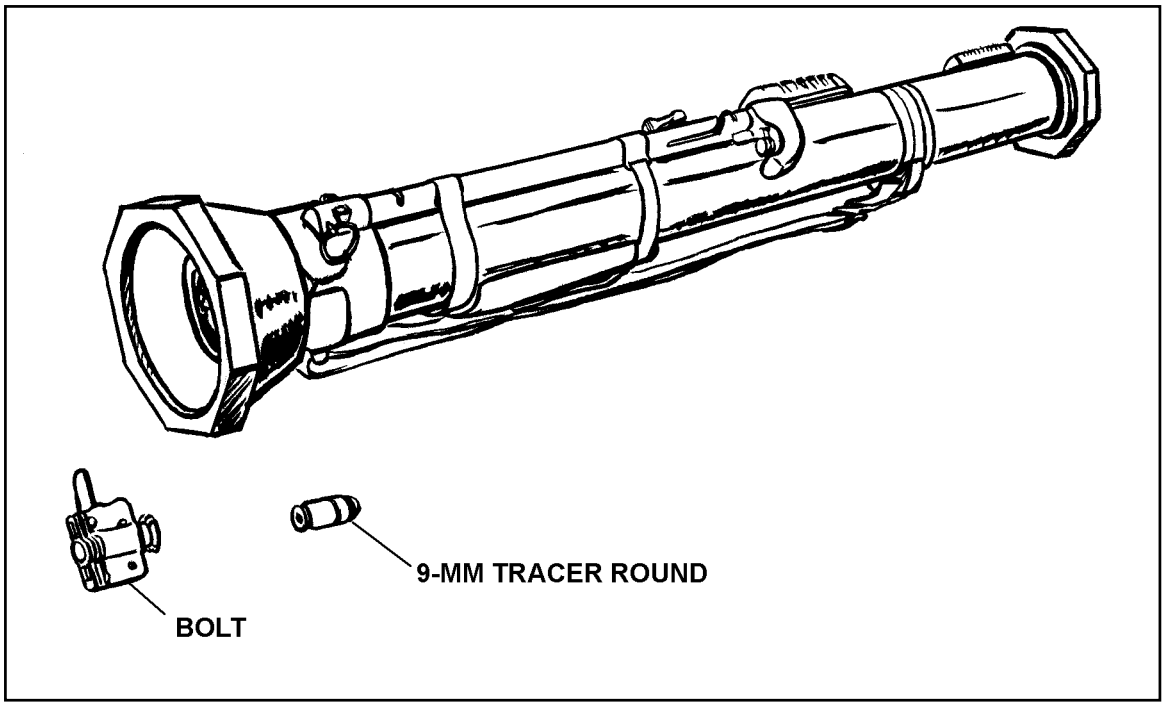


Figure B-5. M287 subcaliber tracer trainer.

a. **Description**. The M287 tracer trainer is a specially constructed AT4. Unlike the LAW subcaliber trainer, it is *not* made from an expended launcher, so it has its own NSN. It is designed to accept a special rifle barrel that fires a reduced-load 9-mm cartridge.

(1) The M287 may be fired at stationary or moving targets. Before it can be fired at a target tank occupied by personnel, the parts of the tank that could suffer damage must be shielded. The local TSC can provide specifications for modifying tanks to be used as targets for the M287 tracer trainer.

(2) Unlike the M136 AT4 itself and the FHT, the M287 has no band between the front and rear sights. The trainer has a 9-mm submachine gun barrel, a breach assembly, and a bolt (Figure B-6). The bolt is easily removed to load the 9-mm cartridges and to inspect the barrel for obstructions.

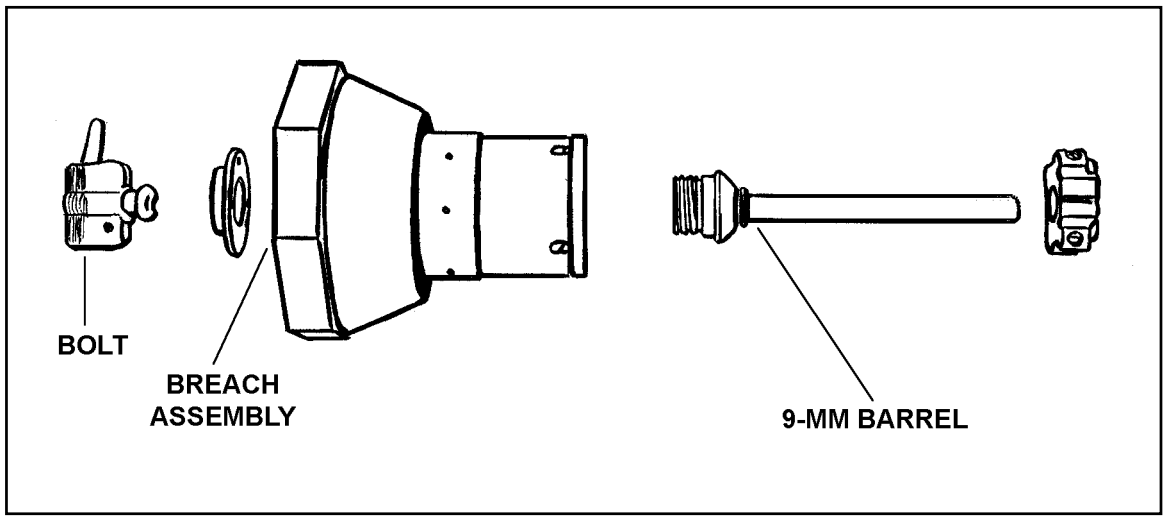


Figure B-6. M287 barrel assembly and components.

(3) If the M287 tracer trainer is damaged, the unit armorer can replace its complete firing mechanism, firing rod, bolt, sights, sling, and 9-mm barrel assembly (Figure B-7).

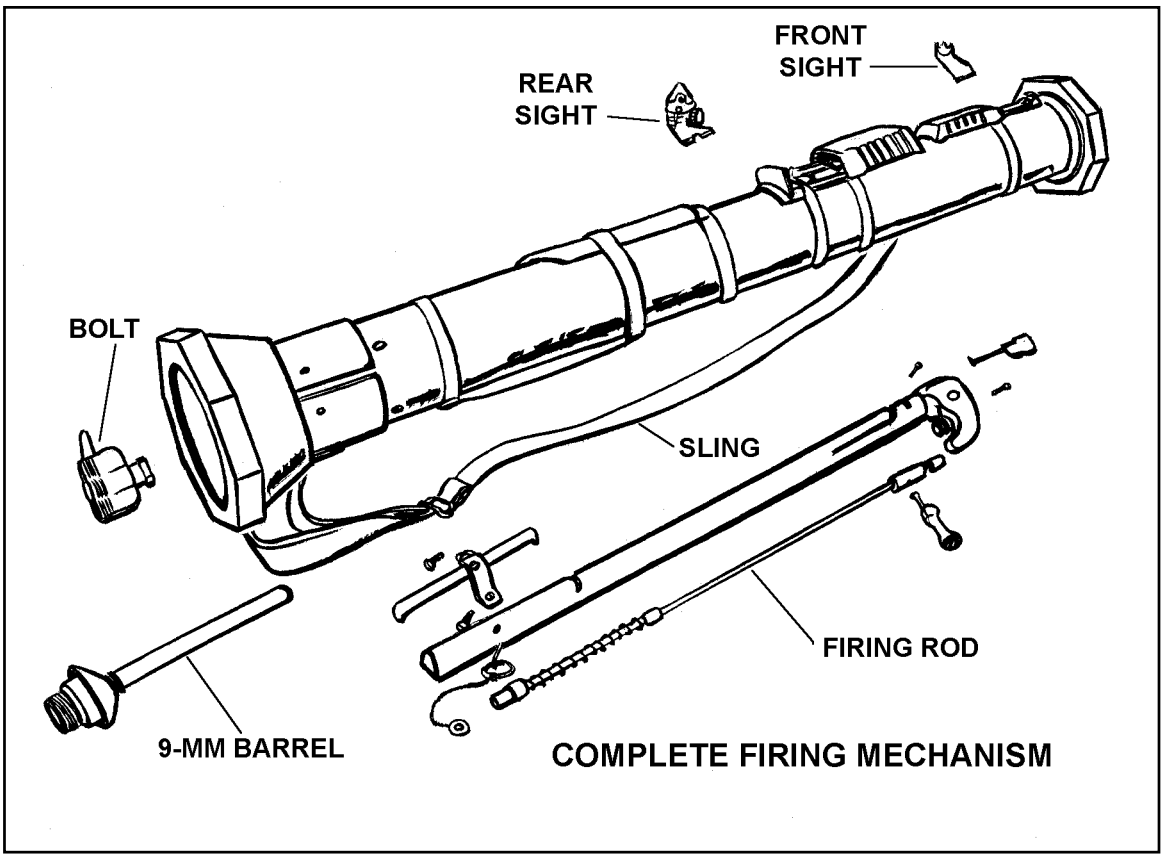


Figure B-7. Replaceable parts for the M287 tracer trainer.

b. **Technical Data**. The following technical data apply to the M287 subcaliber tracer trainer:

Length	1,020 mm (40 inches)
Weight	7 kg (15 pounds)
Action	Mechanical
Sights:	
Front	Three-post system
Rear	Adjustable range, with two peepholes: 2-mm peephole for daylight and 7-mm peephole for limited visibility
Operating temperature	10 degrees to 27 degrees Centigrade
	(0 degrees to 100 degrees Fahrenheit)
Muzzle velocity	300 mps
	(984 fps)
Caliber	9 mm

c. **Ammunition**. The M939 9-mm tracer cartridge has a lighter powder charge than a standard 9-mm bullet. The lighter charge enables the cartridge to closely duplicate the trajectory of the AT4 tactical round at ranges out to 700 meters. The M939 cartridge also has a tracer element to enable the firer to compare the impact of the cartridge with the sight picture. The firer can see the tracer out to 550 meters. Firing the M287 tracer trainer helps the firer learn the correct sight picture for moving targets. The cartridge's red tip and half-black base (Figure B-8) distinguishes it from standard 9-mm ammunition, which should never be fired from the M287 tracer trainer.

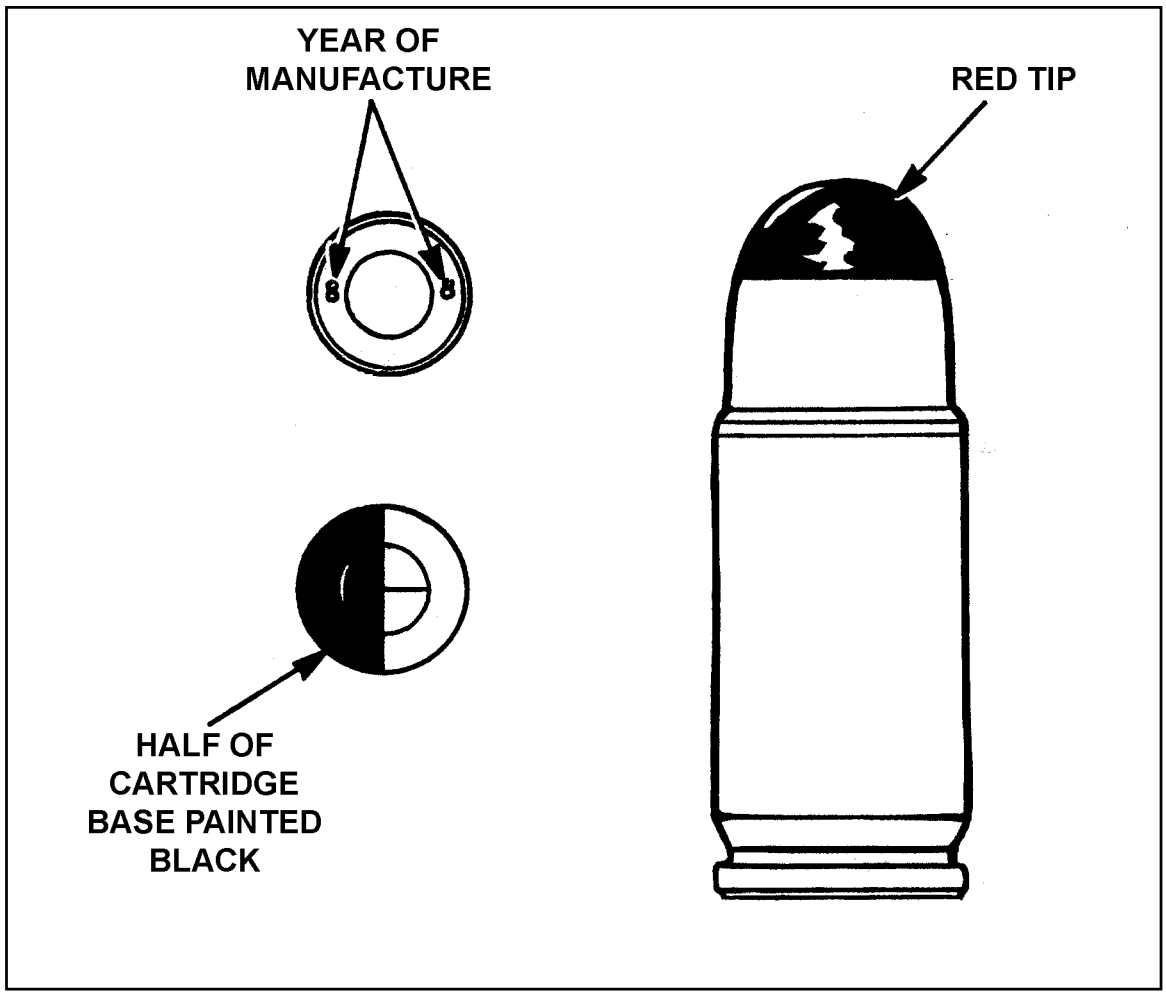


Figure B-8. M939, 9-mm tracer cartridge.

d. **Function Check**. Before the M287 is fired, a function check must be performed to ensure the trigger and safety mechanisms are operating properly. Function check procedures are shown in Table B-1. However, before performing a function check, ensure—

- The *cocking lever* is in the safe ("S") position.
- The *transport safety pin* is fully inserted, with the lanyard wrapped clockwise around the launcher.
- The *bolt* is removed from the breech.

STEP	OPERATOR ACTIONS	FUNCTION CHECK	CORRECTIVE MEASURES
1	Try to cock the tracer trainer	It should not cock	If it cocks, turn the trainer in for repair
2	Remove the transport safety pin and depress the forward safety	The forward safety should spring back when released	If it does not spring back, turn the tracer trainer in for repair
3	Cock the firing mechanism, pressing only the red trigger button	The firing rod should move only slightly and should be captured by the safety lever assembly. No more than half the rod should protrude through the rear of the firing assembly	If the tracer trainer fires, turn it in for repair
4	Recock the firing mechanism; fully depress and continue to hold down the forward safety; press the red trigger button	The tracer trainer should fire	If the tracer trainer *fails* to fire, turn it in for repair
5	Return the cocking lever to the SAFE position and reinstall the transport safety pin		

Table B-1. Function check, M287 tracer trainer.

WARNING

LOAD LIVE AMMUNITION ONLY ON THE FIRING LINE. NEVER FIRE THE M287 TRACER TRAINER AT HARD TARGETS LESS THAN 125 METERS FROM THE FIRING LINE. REMAIN CLEAR OF THE FRONT OF THE M287, WHICH MUST BE POINTED DOWNRANGE AT ALL TIMES.

e. **Loading**. The M287 tracer trainer is loaded as follows:

(1) The firer performs the function check and places the M287 tracer trainer on his shoulder.

(2) The trainer looks through the barrel from the rear to verify that it contains no obstructions. He inspects the cartridge primer to ensure it is not dented, inserts the bolt into the breech (Figure B-9), and presses in and turns the bolt clockwise to the "S" to

place it in the safe position (Figure B-10). Then he arms the tracer trainer by turning the bolt clockwise to "F" so that it can be fired (Figure B-11).

(3) With the launcher still on his shoulder, the firer cocks the launcher by placing the cocking lever in the cocked position.

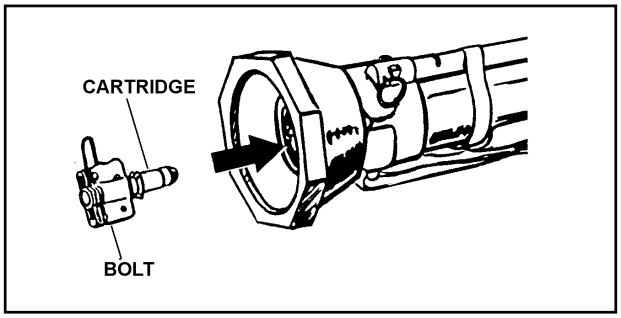


Figure B-9. Inserting bolt with cartridge into the breech of the M287 tracer trainer.

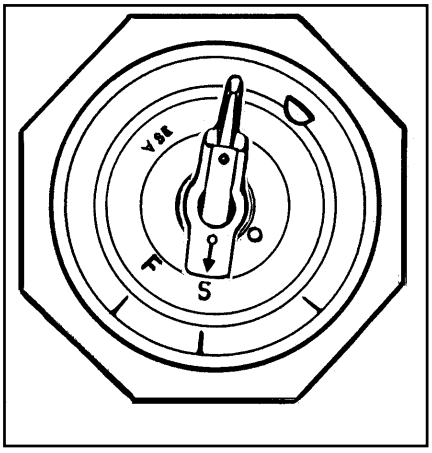


Figure B-10. Ensuring tracer trainer bolt is in the safe position.

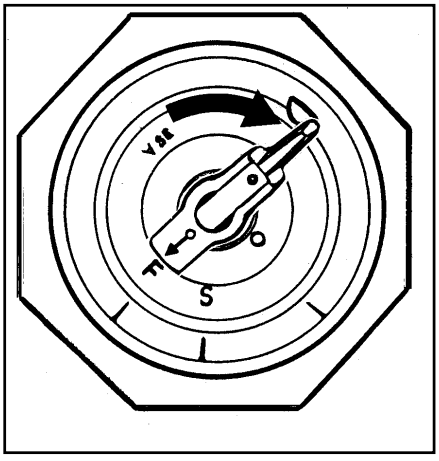


Figure B-11. Arming the tracer trainer.

f. **Unloading**. With the tracer trainer still on the firer's shoulder, the trainer or instructor removes the bolt by turning it counterclockwise past the "S," then pulling the bolt from the breech (Figure B-12). If more rounds are to be fired, he removes the expended cartridge and reloads the bolt.

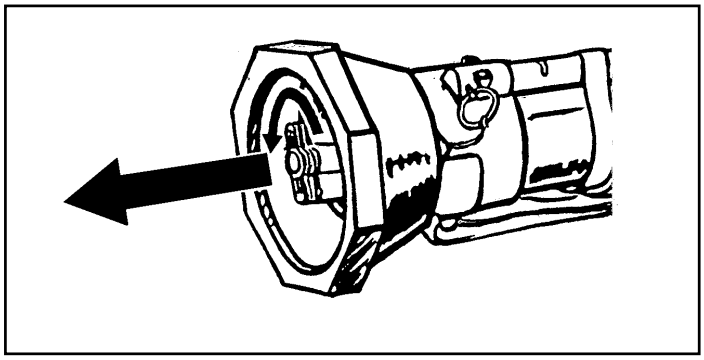


Figure B-12. Unloading the tracer trainer.

g. **Reloading**. With the tracer trainer still on his shoulder, the firer places the cocking lever in the safe position, keeping the tracer trainer on his shoulder and pointing toward the target. The trainer reloads the tracer trainer and prepares it for firing.

DANGER
NEVER TOUCH THE TRIGGER WHILE RELOADING.

h. **Misfire Procedures**. In the event of a misfire—

(1) Immediately shout "Misfire!"

(2) Release the forward safety, recock the launcher, and ensure the cocking lever is erect. Fully depress and hold down the forward safety, then aim and press the red trigger button.

(3) If the tracer trainer still fails to fire, repeat the two previous steps.

(4) If the launcher fails to fire again, release the forward safety, maintain your firing position, and return the cocking lever to the safe position.

(5) Notify the training supervisor.

(6) If a real misfire occurs that cannot be corrected by following the steps previously discussed, the trainer or assistant trainer on duty must ensure the cocking lever is in the safe position and that the forward safety is in the vertical position. He must then insert the transport safety pin and remove and inspect the cartridge. If the primer is dented, he replaces it, disposing of the old one IAW range safety SOP. If the primer is not dented, he notifies DS maintenance to inspect the bolt firing pin for damage. He then reloads the tracer trainer and continues the training exercise.

i. **Range Procedures and Safety**. These are the same as for the M136 AT4.

APPENDIX C
PERFORMANCE EVALUATIONS

The trainer administers performance evaluations to determine how much training the soldiers have learned. Those who fail are retrained and retested, and those who pass help retrain and evaluate those who did not. Instructions are given for right-handed firers: the M136 AT4 may only be fired right-handed, but the M72-series LAW may be fired left-handed, if procedures are reversed. Tasks are generic to both light antiarmor weapons. Conditions and standards may also be generic but, if not, are given by weapon.

TASK 1: Perform serviceability checks on a light antiarmor weapon.

CONDITIONS: Given an expended light antiarmor weapon under suitable conditions or in an appropriate location.

M72-Series LAW

STANDARDS: The firer performs the following actions:

TRAINING AND EVALUATION

1. Inspects the launcher to ensure it has no cracks, dents, or bulges.

2. Ensures the trigger arming handle is present and in the SAFE position.

3. Checks the rubber boots around the trigger bar and detent for cracks, tears, and deterioration.

4. (*M72A2 only*) Inspects the data plate on the right forward side of the launcher to ensure the words "with coupler" appear on the first line. If not, informs the trainer.

M136 AT4

STANDARDS: The firer performs the following actions:

TRAINING AND EVALUATION

1. Ensures the launcher has no cracks, dents, or bulges, or reports these defects to the instructor.

2. Ensures the transport safety pin is in place, or reports this defect to the instructor.

3. Ensures the cocking lever is in the SAFE (uncocked) position, or reports this defect to the instructor.

4. Ensures the muzzle cover is intact, or reports this defect to the instructor.

5. Ensures the color-coded band is correct, or reports this defect to the instructor.

6. Ensures the sights function properly, or reports this defect to the instructor.

7. Ensures the venturi has no foreign objects, or reports this defect to the instructor.

8. Ensures the forward safety functions properly, or reports this defect to the instructor.

9. Ensures the red trigger button is not broken or missing, or reports this defect to the instructor.

10. Ensures the shoulder stop is not broken or damaged, or reports this defect to the instructor.

11. Ensures the carrying sling is not frayed and is firmly attached to the launch tube, or reports this defect to the instructor.

RESULTS **GO** **NO-GO**

Critique and grade the soldier.

TASK 2: Place a light antiarmor weapon into operation.

CONDITIONS: Given an expended light antiarmor weapon (FHT) on a range or in garrison.

M72-Series LAW

STANDARDS: The firer performs the following actions, in sequence:

TRAINING AND EVALUATION

1. Removes the rear cover pull pin.

2. Releases the rear cover and sling assembly.

3. Extends the launcher vigorously and ensures it is fully extended.

4. Places the launcher on his firing shoulder.

5. Checks the backblast area.

6. Pulls the arming handle out.

7. Sights.

M136 AT4

STANDARDS: The firer performs the following actions, in sequence:

TRAINING AND EVALUATION

1. Cradles the AT4 in his arms.

2. Removes the transport safety pin.

3. Unsnaps and unfolds the shoulder stop.

4. Places the AT4 on his shoulder.

5. Releases the sights.

6. Checks the backblast area.

7. Places cocking lever in the ARMED (cocked) position.

8. Fully depresses and holds down the forward safety.

RESULTS **GO** **NO-GO**

Critique and grade the soldier.

TASK 3: Demonstrate the standing position used to fire a light antiarmor weapon.

CONDITIONS: Given a target and an expended light antiarmor weapon in any suitable location.

STANDARDS: The firer demonstrates the standing position as follows:

TRAINING AND EVALUATION

M72-Series LAW

1. Faces the target by executing a half-left face turn and spreading feet a comfortable distance apart.

2. Places the launcher on the shoulder with the left hand directly under the forward portion of the launcher.

3. Places the right elbow against the body for stability.

M136 AT4

1. Faces the target by executing a half-left face turn and spreads the feet a comfortable distance apart.

2. Places the launcher on the shoulder and grasps the sling near the launcher's muzzle with the left hand.

3. Places the right elbow against the body for stability.

RESULTS **GO** **NO-GO**

Critique and grade the soldier.

TASK 4: Demonstrate the kneeling position used to fire a light antiarmor weapon.

CONDITIONS: Given a target and an expended light antiarmor weapon in a suitable location, with the soldier in the standing position.

STANDARDS: The firer demonstrates the kneeling position as follows:

TRAINING AND EVALUATION

1. Kneels on the right knee with the right thigh at a 90-degree angle to the line of aim.

2. Sits back on the right heel and shifts weight forward.

3. Rests the upper left arm forward of the left knee.

4. Places the right arm against the body.

RESULTS **GO** **NO-GO**

Critique and grade the soldier.

TASK 5: Demonstrate the sitting position used to fire a light antiarmor weapon.

CONDITIONS: Given a light antiarmor weapon training device or expended launcher in a suitable location, with the soldier in the standing position.

STANDARDS: Each firer demonstrates the sitting position as follows:

TRAINING AND EVALUATION

1. Keeps the launcher pointed toward the target.

2. Executes a half-left face turn and sits with the legs crossed.

3. Places the launcher on the right shoulder.

4. Leans slightly forward from the hips.

5. Rests the elbows forward of the knees to avoid bone-to-bone contact.

RESULTS **GO** **NO-GO**

Critique and grade the soldier.

TASK 6: Demonstrate the prone position used to fire a light antiarmor weapon.

CONDITIONS: Given a target and an expended light antiarmor weapon (FHT) in a suitable location.

STANDARDS: The firer demonstrates the prone position as follows:

TRAINING AND EVALUATION

1. To keep clear of the backblast area, lies down at an angle of not less than 45 degrees from the line of fire.

2. Keeps back straight and right leg directly on line with the right hip and right shoulder.

3. Moves left leg as far as possible to ensure comfort.

4. Holds both elbows well below the launcher.

5. Checks the backblast area to ensure that no part of the body is in it.

6. Holds head as steady as possible, with the firing eye lined up with the sights.

RESULTS **GO** **NO-GO**

Critique and grade the soldier.

TASK 7: Identify enemy vehicles and weapons.

CONDITIONS: Given ten vehicle identification cards (GTA 17-2-13).

STANDARDS: The soldier correctly identifies eight out of ten vehicles or weapons by nomenclature.

RESULTS **GO** **NO-GO**

Critique and grade the soldier.

TASK 8: Estimate range.

CONDITIONS: Given stationary, partly exposed, or fully exposed targets at ranges between 50 and 250 meters, during daylight, in weather conditions where all targets are visible. Targets include personnel, equipment, silhouettes, and vehicles.

STANDARDS: The soldier states the distance to each target with no more than 20 percent error.

RESULTS **GO** **NO-GO**

Critique and grade the soldier.

TASK 9: Apply the correct lead for a target.

CONDITIONS: Given a sight template, a series of ten flank, frontal, and oblique silhouettes of armored targets, rates of movement, and ranges. (At least three different views, speeds, and ranges are given.)

STANDARDS: The soldier uses correct sighting procedures and correctly applies the lead eight out of ten times.

RESULTS **GO** **NO-GO**

Critique and grade the soldier.

TASK 10: Perform misfire procedures on a light antiarmor weapon.

CONDITIONS: Given a previously fired light antiarmor weapon and instructions that the weapon has misfired, on a suitable firing range, under simulated combat conditions, in any lighting conditions.

M72-series LAW

STANDARDS: The soldier applies misfire procedures as follows and tries to fire the M72-series LAW. If the weapon still fails to fire, he disposes of it IAW unit SOP:

TRAINING AND EVALUATION

1. Immediately squeezes the trigger bar again.

2. If the LAW still does not fire, tries to place the trigger arming handle on SAFE.

3. Removes the launcher from the shoulder and partly collapses it (10 to 15 centimeters or 4 to 6 inches), keeping the launcher pointed upward and downrange.

4. Extends the launcher.

5. If the LAW fails to fire again, squeezes the trigger, tries to return the weapon to SAFE, partly collapses the launcher, and sets the weapon aside.

M136 AT4

STANDARDS: The soldier performs combat misfire procedures on the AT4 as follows:

TRAINING AND EVALUATION

1. Releases the forward safety with the right hand.

2. Recocks the firing mechanism using the cocking lever.

3. Presses and holds down the forward safety, aims, and presses the trigger.

4. If launcher still fails to fire, repeats Steps 1 and 2.

5. If the launcher again fails to fire, returns the cocking lever to the SAFE (uncocked) position.

6. Removes the weapon from the shoulder, keeping it pointed toward the target.

7. Replaces the transport safety pin.

8. Informs the instructor that the firer breaks the sights off to indicate a misfired weapon when in combat.

9. Places the launcher on the ground, pointing toward the target.

RESULTS **GO** **NO-GO**

Critique and grade the soldier.

TASK 11: Return the light antiarmor weapon to its carrying configuration.

CONDITIONS: Given an expended light antiarmor weapon in a suitable location.

STANDARDS: The soldier performs the following actions, in sequence:

M72-series LAW

TRAINING AND EVALUATION

1. Pushes in the trigger arming handle.

2. Removes the launcher from the shoulder.

3. Depresses the barrel detent and collapses the launch tube, guiding the front and rear sights into position.

4. Replaces the sling assembly.

5. Replaces the rear cover pull pin.

M136 AT4

1. Releases the forward safety.

2. Returns the cocking lever to the SAFE (uncocked) position by pushing forward and upward on it, then letting it spring back into position.

3. Removes the launcher from the shoulder, ensuring the muzzle is pointed in the direction of fire.

4. Replaces the transport safety pin, fully seating it in the retainer hole.

5. When closing the rear sight, resets the range indicator to the 200-meter setting. (If this step is not accomplished, the rear sight breaks off when the sight cover is closed.)

6. Restores the sights by laying them down and closing their covers.

7. Snaps the shoulder stop into the closed position.

8. Moves to another location; slings the launcher over either shoulder and moves out.

RESULTS **GO** **NO-GO**

Critique and grade the soldier.

APPENDIX D

SUGGESTED DESIGN FOR COMBINED LIGHT ANTIARMOR RANGE

This appendix provides basic guidance for units to establish a range complex for light antiarmor weapons. The complex described may be used for multilevel training and firing of light antiarmor weapons; both subcaliber trainers and live HE ammunition may be used on the same range. Training areas should be near, but not adjacent to, the firing line. The firing line should be designed to allow personnel to observe firing from the side. The target array should include stationary targets composed of F-type targets or the hulls of hard targets (APCs or tanks), a moving target (a target on track or a manned moving target tank [MMTT]), and bunkers. This allows the firer to engage a variety of targets and to develop his skills in the various types of engagements.

D-1. FIRING LINE

The firing line should be organized to allow for the 100-meter AT4 backblast (Figure D-1). Also, at least 20 meters must be allowed between firing points. The backblast area must be fenced, roped, or marked in some way, so soldiers know not to enter it when firing is being conducted. A range that meets the requirements of the AT4 will also meet the requirements of the LAW.

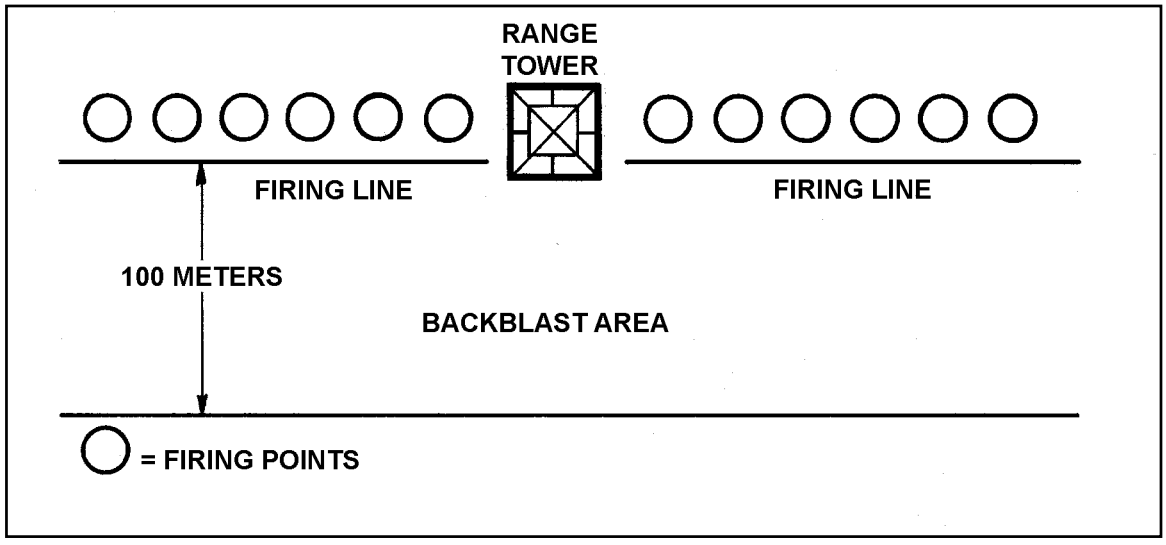


Figure D-1. Firing line.

D-2. TARGET ARRAY

The target array should include targets at ranges of 100 to 700 meters (Figure D-2). This enables the unit to conduct advanced instructional fire on targets located beyond the weapons' maximum effective ranges. Standard vehicle silhouettes or tank hulls should be used for stationary targets. Selected targets should be positioned behind mounds of earth

to simulate vehicles in defilade or partly behind trees or other objects. Firers adjust their points of aim accordingly. Targets should also be positioned to allow firers to engage flank, frontal, and oblique targets. Bunker targets should be placed within the target array at ranges of 100 to 400 meters. Bunker targets should be no more than 1 meter high or 2 1/2 to 3 meters wide. Moving target silhouettes should travel along a track or road so the firers can engage fast moving targets from both flank and oblique angles. The moving targets should be placed at ranges of 150 to 600 meters and should enter and exit from the flanks outside the range fan. Firers may only use HE weapons to engage hard targets. This reduces the damage to other targets the unit must maintain such as F-type silhouettes and bunkers.

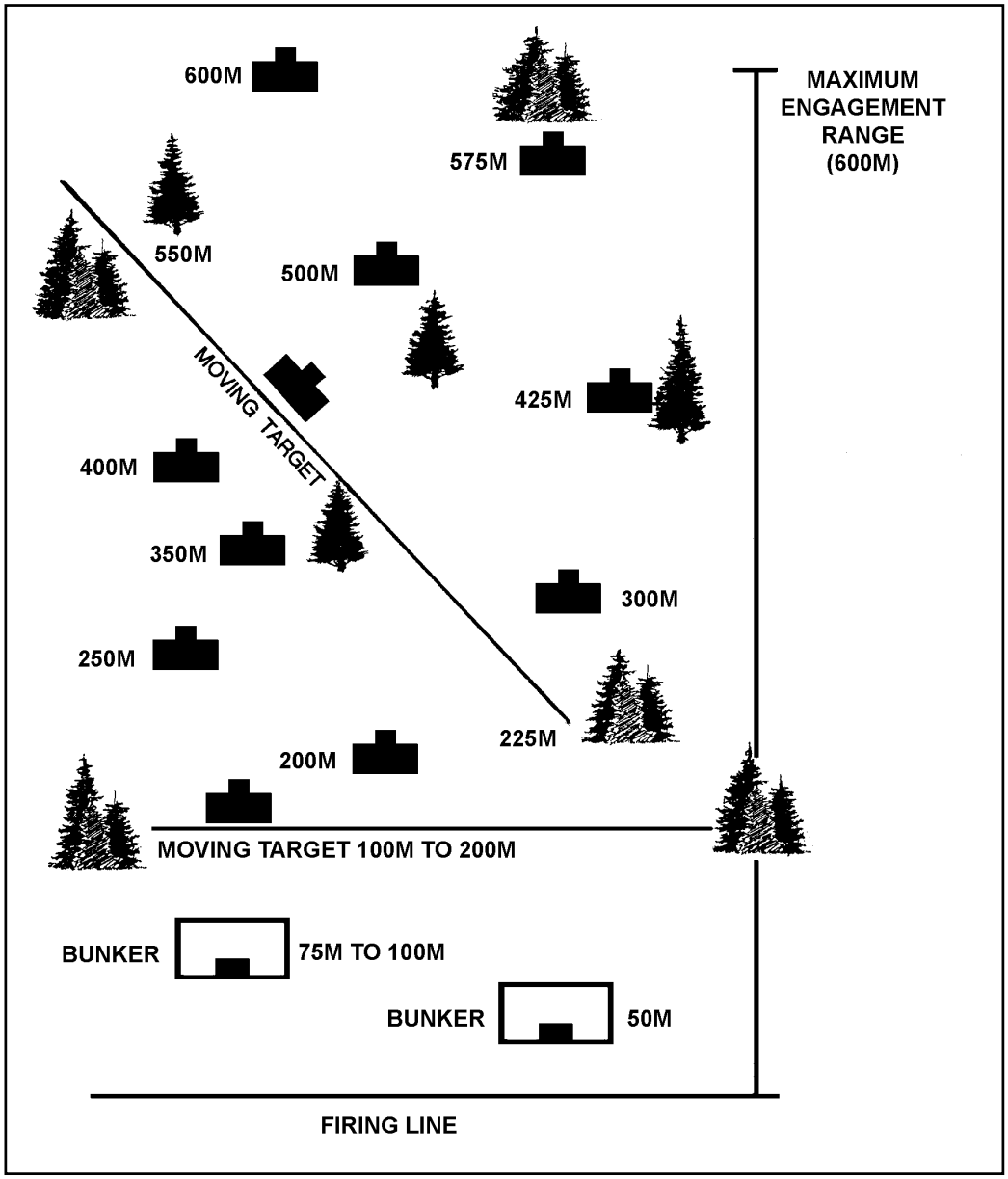


Figure D-2. Target array.

APPENDIX E

FIRING TABLES AND EXAMPLE SCORECARDS

This appendix provides firing tables for the subcaliber gunnery trainers discussed in this manual. It also includes an example of a completed scorecard for each light antiarmor weapon. All instructional and qualification firing tables are conducted on suitable ranges with ammunition designated in the firing tables. Some tables are fired in daylight, others in limited visibility, but all have some NBC firing (Table E-1).

M72-Series LAW	Instructional day fire, stationary targets
	Instructional day fire, moving targets
	Instructional night fire
M136 AT4	Instructional fire
	Instructional night fire
	Qualification fire
	Qualification night fire
	Advanced instructional fire

Table E-1. Firing tables for light antiarmor weapons.

E-1. M72-SERIES LAW

The M190 35-mm subcaliber device is used to fire the instructional firing tables for the M72-series LAW and DA Form 7323-R (M72-Series LAW Scorecard) is used to score them. Figure E-1 shows an example of the completed form. The instructional day and night firing tables for the LAW are provided in Tables E-2 and E-3.

NOTE: A blank copy of the form is located at the end of this publication for local reproduction on 8 1/2-inch by 11-inch paper.

M72-SERIES LAW SCORECARD

Instructions for using this form are provided in FM 23-25.
TRADOC is the proponent agency.

NAME THIELE, STEPHEN SSN 123-45-6789 DATE 19 APR 94

GRADE E-5 RATING 1ST CLASS UNIT HHC 2/29 INF. REGT. WEATHER (circle one) CLEAR (RAIN) FOG SNOW

DATA REQUIRED BY THE PRIVACY ACT OF 1974

AUTHORITY: 10 USC 3012(g) / Executive Order 9397 **PRINCIPAL PURPOSE(S):** Record individual performance. **ROUTINE USES:** Evaluate individual proficiency and determine proficiency level. SSN is used for positive identification purposes only. **MANDATORY OR VOLUNTARY DISCLOSURE AND EFFECT ON INDIVIDUAL NOT PROVIDING INFORMATION:** Voluntary. Individuals not providing information cannot be rated/scored on a mass basis.

TABLE	TYPE OF FIRE	TYPE OF TARGET	ROUND	RANGE (M)	FIRING POSITION	HIT	MISS
1	Instructional DAY	Stationary	1	125 to 150	Standing	✓	—
			2	150 to 175	Kneeling	✓	—
			* 3	150 to 200	Sitting	✓	—
			* 4	125 to 150	Prone	✓	—
					Table Subtotals	4	0
2	Instructional DAY	Moving	1	100 to 200	Standing	✓	—
			2	100 to 200	Sitting	✓	—
			* 3	100 to 200	Kneeling	—	✓
					Table Subtotals	2	1
3	Instructional NIGHT	Stationary	1	100 to 150	Kneeling	—	✓
			2	100 to 150	Sitting	✓	—
			* 3	100 to 150	Sitting	✓	—
					Table Subtotals	2	1

FIRER'S SIGNATURE Stephen Thiele DATE 19APR 94 SCORER'S SIGNATURE Benny C Martin DATE 19APR94

FIRER'S SIGNATURE Stephen Thiele DATE 20APR94 SCORER'S SIGNATURE Benny C Martin DATE 20 APR 94

FIRER'S SIGNATURE Stephen Thiele DATE 21 APR 94 SCORER'S SIGNATURE Benny C Martin DATE 21 APR 94

* Firer must wear a protective mask when firing this round.

CONSOLIDATED SCORES

FIRER'S SIGNATURE Stephen Thiele DATE 21 APR 94 TOTAL MISSES 2

SCORER'S SIGNATURE Benny C Martin DATE 21 APR 94 RANK SFC

RANGE OIC'S SIGNATURE Terry Anderson DATE 21APR 94 RANK CPT

INSTRUCTOR NOTES	
ALL FIRING TABLES	• Do not announce the ranges to targets. • Fire all engagements in sequence.

DA Form 7323, JUL 94

Figure E-1. Example completed DA Form 7323-R.

TABLE 1 M72-Series LAW Instructional Day Fire, Stationary Targets	
TASK	Each soldier engages stationary armored targets with the M190 subcaliber device.
CONDITIONS	Given one M190 subcaliber device and four M73 rockets, on a suitable firing range with stationary targets at a range of 100 to 225 meters. Two targets are engaged in MOPP4.
STANDARD	The soldier fires four rockets at stationary targets and achieves at least three hits.
TABLE 2 **M72-Series LAW Instructional Day Fire,** **Moving Targets**	
TASK	Each soldier engages moving armored targets with the M190 subcaliber device.
CONDITIONS	Given one M190 subcaliber device, three M73 rockets, and targets moving at a rate of 8 to 24 kmph and at a range of 100 to 200 meters. Frontal and oblique-moving targets may be used when a manned, moving tank is available. One target is engaged in MOPP4.
STANDARD	The soldier fires three rockets at moving targets and achieves at least two hits.

Table E-2. Instructional day firing tables for the M72-series LAW.

TABLE 3 M72-Series LAW Instructional Night Firing Before you can use the AN/PVS-4, you must install an M72A1 sight reticle on it and Boresight it to an expended M72-series LAW launcher.	
TASK	Each soldier engages stationary targets at night with the M190 subcaliber device.
CONDITIONS	Given one M190 subcaliber device and three M73 rockets, on a suitable firing range with stationary targets at a range of 100 to 150 meters, at night, and either an AN/PVS-4 or illumination provided by indirect fire.
STANDARD	The soldier fires three rockets at stationary targets and achieves at least one hit. He engages one of these targets in MOPP4.

Table E-3. Instructional night firing table for the M72-series LAW.

E-2. M136 AT4

The M287 9-mm tracer bullet trainer is used to fire the instructional, qualification, and advanced instructional firing tables for the M136 AT4 and DA Form 7324-R (M136 AT4 Scorecard) is used to score them. A copy of this form is located at the end of this publication for local reproduction on 8 1/2-inch by 11-inch paper. Figure E-2 shows an example of the completed form; Tables E-4 through E-6, on pages E-7, E-8, and E-9, provide the instructional, qualification, and advanced instructional firing tables for the AT4. The latter must be fired on a separate, more specialized range.

E-3. NIGHT COURSE OF FIRE TABLES AND QUALIFICATION FOR M136 AT4

Each soldier is given a PMI before the instructional and qualification tables are fired. Once the soldier completes Table I and III (day tables), he is given additional instruction on the use of the aided vision devices for the night operations.

a. **Qualification Tables for the M287 Tracer Trainer.**

- Table I (Instructional Day). This scenario consists of 12 targets from 100 to 300 meters. The standard to proceed to the next table is 6 out of 12 targets successfully engaged.
- Table II (Instructional Night). This scenario consists of 8 targets from 100 to 300 meters. The standard to proceed to the next table is 6 out of 12 targets successfully engaged at night.
- Table III (Qualification Day). This scenario consists of 8 targets from 100 to 300 meters. The standard to proceed to the next table is 6 out of 8 targets successfully engaged.
- Table IV (Qualification Night). This scenario consists of 8 targets from 100 to 300 meters (same as Table III, but conducted at night). The standard to proceed to the advanced firing tables is 6 out of 8 targets successfully engaged.

NOTES: 1. In Table IV, eight engagements are proposed as opposed to the current six engagements.

2. All references to the M136 launcher and cartridge refer to the M287 9-mm tracer bullet training device.

b. **Ammunition Requirements for Night Training Strategy**. The current STRAC ammunition allocation and course of fire is compared with the proposed night training strategy in Table E-7 on page E-9. The current STRAC table stipulates that 120 rounds of 9-mm tracer ammunition is authorized to each squad for additional squad members to fire Tables I and IV.

c. **Day Standards**. Commanders are able to achieve the current day standard at night with the M136 AT4 through the use of training strategy within this field manual. A gunner who is qualified on the day standard and has executed preliminary marksmanship training with the appropriate night vision device can achieve the current day standard at night. During testing, gunners had no problem engaging targets out to 300 meters. Table E-8, on page E-9, shows the day standard and is also the proposed night standard.

M136 AT4 SCORECARD

Instructions for using this form are provided in FM 23-25.
TRADOC is the proponent agency.

NAME DINKENS, DAVID SSN 135-24-5678 DATE 19 APR 94

GRADE E-3 RATING _____ UNIT HHC 3/29 INF REGT. WEATHER (circle one) CLEAR (RAIN) FOG SNOW

DATA REQUIRED BY THE PRIVACY ACT OF 1974

AUTHORITY: 10 USC 3012(g) / Executive Order 9397. **PRINCIPAL PURPOSE(S):** Record individual performance. **ROUTINE USES:** Evaluate individual proficiency and determine proficiency level. SSN is used for positive identification purposes only. **MANDATORY OR VOLUNTARY DISCLOSURE AND EFFECT ON INDIVIDUAL NOT PROVIDING INFORMATION:** Voluntary. Individuals not providing information cannot be rated/scored on a mass basis.

TABLE	TYPE OF FIRE	TYPE OF TARGET	ROUND	RANGE (M)	FIRING POSITION	HIT	MISS
1	Instructional Day	Stationary	1	150 to 200	Kneeling	✓	
		Stationary	* 2	150 to 200	Kneeling	✓	
		Stationary	3	250 to 300	Sitting	✓	
		Stationary	4	250 to 300	Sitting	✓	
		Stationary	5	125 to 150	Prone	✓	
		Stationary	6	125 to 150	Prone	✓	
		MMTT/MAS	7	150 to 200	Kneeling	✓	
		MMTT/MAS	* 8	150 to 200	Kneeling	✓	
		MMTT/MAS	9	200 to 250	Standing		✓
		MMTT/MAS	*10	200 to 250	Fighting position, unsupported		✓
		MMTT/MAS	11	250 to 300	Kneeling	✓	
		MMTT/MAS	12	250 to 300	Kneeling		✓
					Table Subtotals	9	3

FIRER'S SIGNATURE David Dinkens DATE 19 APR 94 SCORER'S SIGNATURE Dan Sell DATE 19 APR 94

2	Instructional Night	Stationary	1	125 to 150	Prone		✓
		Stationary	2	125 to 150	Prone	✓	
		Stationary	* 3	150 to 200	Sitting	✓	
		Stationary	4	150 to 200	Sitting	✓	
		Stationary	5	250 to 300	Kneeling		✓
		Stationary	6	250 to 300	Kneeling	✓	
		MMTT/MAS	7	125 to 150	Standing	✓	
		MMTT/MAS	8	125 to 150	Standing	✓	
		MMTT/MAS	* 9	200 to 250	Kneeling	✓	
		MMTT/MAS	10	200 to 250	Kneeling	✓	
		MMTT/MAS	11	150 to 200	Standing		✓
		MMTT/MAS	12	150 to 200	Fighting position, unsupported	✓	
					Table Subtotals	9	3

FIRER'S SIGNATURE David Dinkens DATE 19 APR 94 SCORER'S SIGNATURE Dan Sell DATE 19 APR 94

* Firer must wear a protective mask when firing this round.

INSTRUCTOR NOTES	
ALL FIRING TABLES	• Do not announce the ranges to targets. • Fire all engagements in sequence. • Fire Table 1 before Table 3; fire Table 2 before Table 4.
FIRING TABLES 2 THROUGH 5	• Ensure no one fires at front or rear of a manned moving tank target. • Total hits and misses, and enter results in the consolidated scores block on the back of this scorecard.

DA Form 7324-R, JUL 94 (FRONT)

Figure E-2. Example completed DA Form 7324-R (front).

M136 AT4 SCORECARD

TABLE	TYPE OF FIRE	TYPE OF TARGET	ROUND	RANGE (M)	FIRING POSITION	HIT	MISS
3	Qualification Day	Stationary	1	125 to 150	Standing	✓	
		Stationary	2	150 to 200	Kneeling	✓	
		Stationary	* 3	200 to 250	Sitting	✓	
		Stationary	4	250 to 300	Sitting	✓	
		MMTT/MAS	5	125 to 150	Kneeling	✓	
		MMTT/MAS	6	150 to 200	Fighting position, unsupported		✓
		MMTT/MAS	* 7	200 to 250	Sitting	✓	
		MMTT/MAS	8	250 to 300	Kneeling	✓	
					Table Subtotals	7	1

FIRER'S SIGNATURE David Dinkens DATE 21 APR 94 SCORER'S SIGNATURE Dan Sell DATE 21 APR 94

TABLE	TYPE OF FIRE	TYPE OF TARGET	ROUND	RANGE (M)	FIRING POSITION	HIT	MISS
4	Qualification Night	Stationary	* 1	125 to 150	Standing or Prone	✓	
		Stationary	2	200 to 250	Kneeling	✓	
		Stationary	3	250 to 300	Sitting	✓	
		MMTT/MAS	4	150 to 200	Sitting	✓	
		MMTT/MAS	* 5	125 to 150	Kneeling		✓
		MMTT/MAS	6	200 to 250	Fighting position, unsupported	✓	
					Table Subtotals	5	1

FIRER'S SIGNATURE David Dinkens DATE 21APR94 SCORER'S SIGNATURE Dan Sell DATE 21 APR 94

TABLE	TYPE OF FIRE	TYPE OF TARGET	ROUND	RANGE (M)	FIRING POSITION	HIT	MISS
5	Advanced Instructional	Sequence	1		Sitting	✓	
		Sequence	2		Sitting	✓	
		Pair	3		Kneeling	✓	
		Pair	4		Kneeling	✓	
		Volley	5		Kneeling	✓	
		Volley	* 6		Sitting	✓	
					Table Subtotals	6	0

FIRER'S SIGNATURE David Dinkens DATE 22 APR 94 SCORER'S SIGNATURE Dan Sell DATE 22 APR 94

* Firer must wear a protective mask when firing this round.

QUALIFICATION CRITERIA — BASED ON TOTAL HITS FOR TABLES 3 AND 4

FIRST CLASS ..... 13 HITS
SECOND CLASS ..... 11 HITS
THIRD CLASS ..... 9 HITS
UNQUALIFIED ..... FEWER THAN 9 HITS

CONSOLIDATED SCORES

INSTRUCTIONAL TOTALS (TABLES 1 AND 2): HITS 18 MISSES 6 CLASS RATING, TABLES 1 AND 2: FIRST

QUALIFICATION TOTALS (TABLES 3 AND 4): HITS 12 MISSES 2 OVERALL TOTALS HITS 30 MISSES 8

FIRER'S SIGNATURE David Dinkens DATE 22 APR 94 SCORER'S SIGNATURE Dan Sell DATE 22 APR 94

RANGE OIC'S SIGNATURE [illegible] RANK SFC DATE 22 APR 94

DA Form 7324-R, JUL 94 (BACK)

Figure E-2. Example completed DA Form 7324-R (back).

TABLE 1 M136 AT4 Instructional Fire	
TASK	Each soldier engages an armored target with the M287 tracer bullet trainer.
CONDITIONS	Given one M287 9-mm subcaliber device and twelve rounds of 9-mm tracer ammunition, a suitable firing range, stationary targets at a range of 100 to 300 meters, and other targets moving 8 to 24 kmph at a range of 150 to 200 meters. When a manned, moving tank is available, frontal and oblique-moving targets may be used.
STANDARD	The soldier fires twelve tracer bullets at stationary and moving targets. He engages three of these targets in MOPP4.
TABLE 3 **M136 AT4 Instructional Fire**	
TASK	Each soldier engages an armored target with the M287 tracer bullet trainer at night.
CONDITIONS	At night, given one M287 9-mm subcaliber device and twelve rounds of 9-mm tracer ammunition, artificial illumination, a suitable firing range, stationary targets at a range of 100 to 300 meters, and other targets moving from 8 to 24 kmph (5 to 15 mph) at a range of 150 to 200 meters. When a manned, moving tank is available, frontal and oblique-moving targets may be used.
STANDARD	The soldier fires twelve tracer bullets at stationary and moving targets. He engages two of these targets in MOPP4.

Table E-4. Instructional firing tables for the M136 AT4.

TABLE 2 M136 AT4 Qualification Fire	
TASK	Each soldier engages an armored target with the M287 tracer bullet trainer.
CONDITIONS	Given one M287 9-mm subcaliber device and eight rounds of 9-mm tracer ammunition, a suitable firing range, stationary targets at a range of 100 to 300 meters, and other targets moving at a rate of 8 to 24 kmph (5 to 15 mph) at a range of 150 to 200 meters. When a manned, moving tank is available, frontal and oblique-moving targets may be used.
STANDARD	The soldier fires eight tracer bullets at stationary and moving targets and achieves at least six hits. He engages two of these targets in MOPP4.
TABLE 4 **M136 AT4 Qualification Fire**	
TASK	Each soldier engages an armored target with the M287 tracer bullet trainer.
CONDITIONS	At night, given one M287 9-mm subcaliber device and six rounds of 9-mm tracer ammunition, artificial illumination, a suitable firing range, stationary targets at a range of 100 to 300 meters, and other targets moving 8 to 24 kmph (5 to 15 mph) at a range of 150 to 200 meters. When a manned, moving tank is available, frontal and oblique-moving targets may be used.
STANDARD	At night, given one M287 9-mm subcaliber device and six rounds of 9-mm tracer ammunition, artificial illumination, a suitable firing range, stationary targets at a range of 100 to 300 meters, and other targets moving 8 to 24 kmph (5 to 15 mph) at a range of 150 to 200 meters. When a manned, moving tank is available, frontal and oblique-moving targets may be used.

Table E-5. Qualification firing tables for the M136 AT4.

TABLE 5 M136 AT4 Advanced Instructional Fire Fire this table on an appropriate separate, specialized range.	
TASK	Each soldier engages an armored target with the M287 tracer bullet trainer.
CONDITIONS	Given one M287 9-mm subcaliber device and six rounds of 9-mm tracer ammunition, a suitable firing range, stationary targets at a range of 100 to 300 meters, and other targets moving 8 to 24 kmph (5 to 15 mph) at a range of 150 to 200 meters. When a manned, moving tank is available, frontal and oblique-moving targets may be used.
STANDARD	The soldier must fire six tracer bullets at stationary and moving targets and achieve at least three hits. He must engage two of the targets with sequence firing, two with pair firing, and two with volley firing, and he must observe MOPP4 while engaging one of the six.

Table E-6. Advanced instructional firing table for the M136 AT4.

EVENT	CURRENT STRAC	RECOMMENDED CHANGES	TOTAL
TABLE I	12	0	12
TABLE II	12	0	12
TABLE III (QUALIFICATION)	8	0	8
TABLE IV (NIGHT QUALIFICATION)	6	2	8
TABLE V (ADVANCE)	6	0	0
TOTAL	44	2	40

Table E-7. Ammunition requirements for night training strategy.

M136 AT4 (M287 TRAINER) TABLE III/IV			
ENGAGEMENT	**RANGE**	**POSITION**	**HIT/MISS**
1	125 to 150	Standing	
2	150 to 200	Kneeling	
3	200 to 250	Sitting	
4	250 to 300	Sitting	
5	125 to 150	Kneeling	
6	150 to 200	Fighting Position	
7	200 to 250	Sitting	
8	250 to 300	Kneeling	

Table E-8. M136 AT4 (M287 trainer) Table III/IV.

APPENDIX F
INFRARED LASER AIMING DEVICES

The newest infrared laser pointers increase the night firing accuracy of infantry weapons. The new family of weapon mounts (some fielded with the thermal weapon sight) and helmet brackets are more stable and reliable for continued accurate firing under field conditions. Their effectiveness is limited by the capability of the image-intensifying (I^2) sight with which they are used. Normally this is a night vision goggle or monocular, with or without the 3X magnifier. Again, they primarily enhance the gunner's ability to align his sights on the target, but usually have dramatic affect on his firing positions and scanning technique. Unlike I^2 sights mounted on the weapon, the gunner can somewhat reduce the adverse effects of muzzle flash by rising up higher off the sight with his helmet-mounted goggle or monocular. With the AN/PEQ-2A, the range of these devices is greatly improved, allowing great effectiveness for crew-served weapons out to 2,200 meters. However, trainers and leaders must adopt new safety procedures to ensure these lasers, which are not safe for the eyes, are treated like loaded weapons any time the batteries are issued. Finally, the bore light is also effective to boresight these pointers. Generally weapons do not require zeroing with live ammunition to confirm alignment after soldiers and leaders are qualified in the boresighting techniques. The AT4 cannot be conventionally boresighed, therefore a sight alignment method is used to zero the aided vision device.

F-1. AN/PAQ-4C, AIMING LIGHT

The AN/PAQ-4C aiming light (Figure F-1) projects an infrared laser beam, which cannot be seen with the eye but can be seen with night vision devices. This aiming light works with the AN/PVS-7B/C/D-series goggles and AN/PVS-14. The AN/PAQ-4C mounts on various weapons with mounting brackets and adapters.

a. **Technical Data**. The following technical data apply to the AN/PAQ-4C:

Optics:	100% parallax free, anti-reflective coated lens system
Length (sight):	14 centimeters (5.5 inches)
Weight:	164 grams (5.78 ounces)
Height:	3 centimeters (1.2 inches)
Width:	6.5 centimeters (2.5 inches)
Ranged:	Beyond 600 meters. (Actual range depends on light level and night vision device used for observation.)
Battery life:	100-hour operating (ON) time for AA batteries in temperatures above 0 degrees Centigrade (32 degrees Fahrenheit); 36 hours for temperatures below 0 degrees Centigrade (32 degrees Fahrenheit)

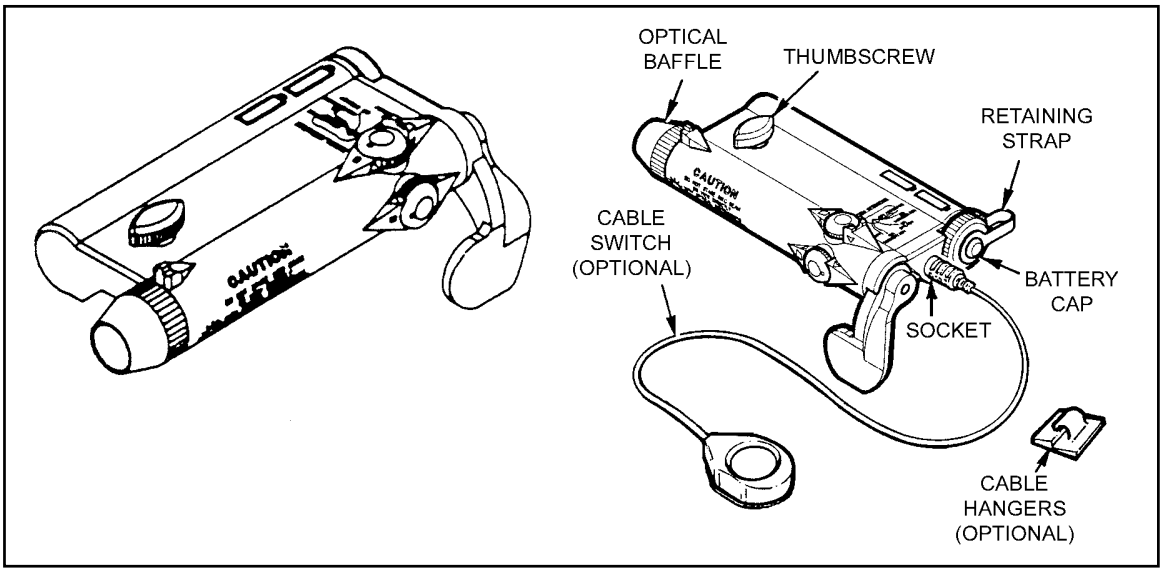


Figure F-1. AN/PAQ-4C, aiming light.

b. **Operation.** Activate the AN/PAQ-4C aiming light by rotating the ON/OFF switch lever or the button on the optional cable switch. Either switch connects power from two AA batteries to an internal electronic circuit, which produces the infrared laser. Internal lenses focus the infrared light into a narrow beam. Control the direction of the beam by rotating the mechanical adjusters with click detents. These adjusters are used to zero the aiming light to the weapon. Once zeroed to the weapon, the aiming light projects the beam along the line of fire of the weapon. The optical baffle prevents off-axis viewing of the aiming light beam by the enemy.

(1) ***M136 (AT4) Launcher and Cartridge Mounting Procedures***. The aiming light is attached to the M136 (AT4) launcher and cartridge by first attaching the mounting bracket to the weapon and then attaching the aiming light to the mounting bracket (Figures F-2 and F3).

STEP 1: Install the mounting bracket.

WARNING

Only M136 (AT4) qualified personnel should install and use the mounting bracket assembly. Conduct all M136 (AT4) operator preventive maintenance checks and services before installation of mounting bracket assembly.

NOTE: All references to the M136 (AT4) launcher and cartridge are also applicable to the M287 9-mm tracer bullet training device.

(a) Cradle the M136 (AT4) in left arm.

(b) Position the support bracket with the mounting rail on the left side and the marking FRONT over the rear sight.

(c) With the pivot bracket spread open, place the support bracket against the base of the rear sight housing and the bottom on the shoulder strap boss.

(d) Swing the pivot bracket around the M136 (AT4) and secure it by rotating the locking latch clockwise to engage the latch shaft.

(e) The lever screw assembly must be located in the rear threaded screw hole when mounting the aiming light. Lever screw assembly may require relocation from the front to the rear threaded screw hole.

(f) Place the bracket adapter (Figure F-2) in groove of the mounting rail so that the threaded screw hole in the base of the adapter is aligned with the lever screw assembly and tighten the lever screw.

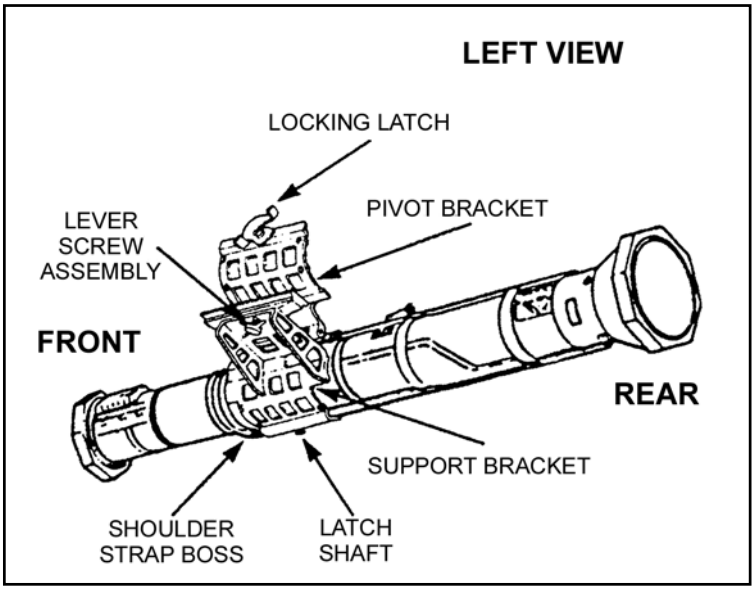


Figure F-2. M136 (AT4) installation.

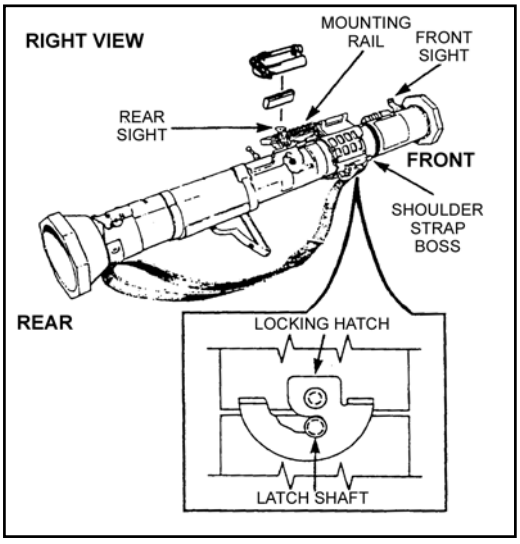


Figure F-3. M136 (AT4) installation (locking latch and shaft).

STEP 2: Install the bracket adapter (Figure F-4). The bracket adapter provides compatibility between the aiming light and the mounting brackets used on the M2, M60, and M136 AT4 weapons.

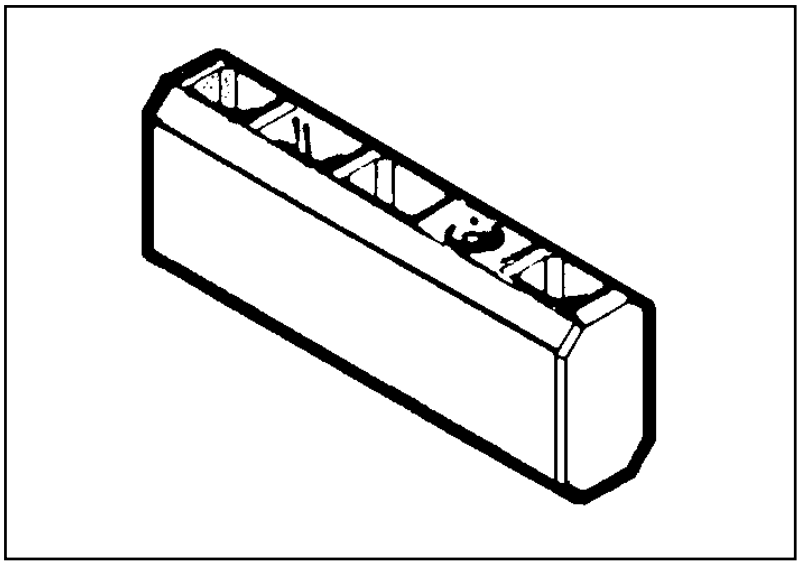


Figure F-4. Bracket adapter.

STEP 3: Attach the AN/PAQ-4 onto the bracket adapter (Figure F-5).

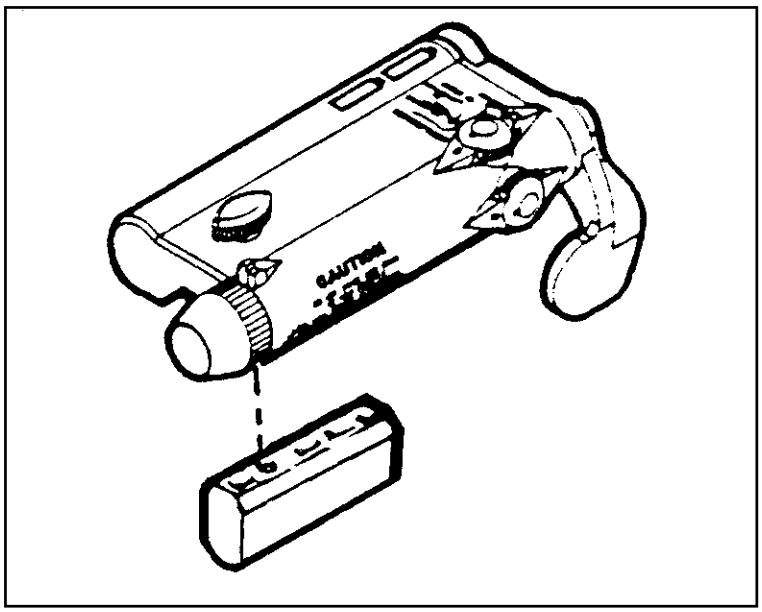


Figure F-5. Attaching bracket adapter to aiming light.

STEP 4: Attach the AN/PAQ-4 to the AN/PVS-4 mounting bracket.

- Position the AN/PAQ-4 on top of the bracket so that the spacer of the AN/PAQ-4 is aligned with the mounting knob of the bracket.
- Turn the mounting knob clockwise until the AN/PAQ-4 is tight.

WARNING
Do not store the AN/PAQ-4 with batteries installed.

(2) ***M136 (AT4) Launcher and Cartridge Dismounting Procedures***.

STEP 1: Detach the AN/PAQ-4 from the AN/PVS-4 mounting bracket.

- Turn the mounting knob counterclockwise until the AN/PAQ-4 is loose.
- Remove the AN/PAQ-4 from the bracket adapter.

STEP 2: Remove the adapter from the AN/PAQ-4

STEP 3: Remove the mounting bracket.

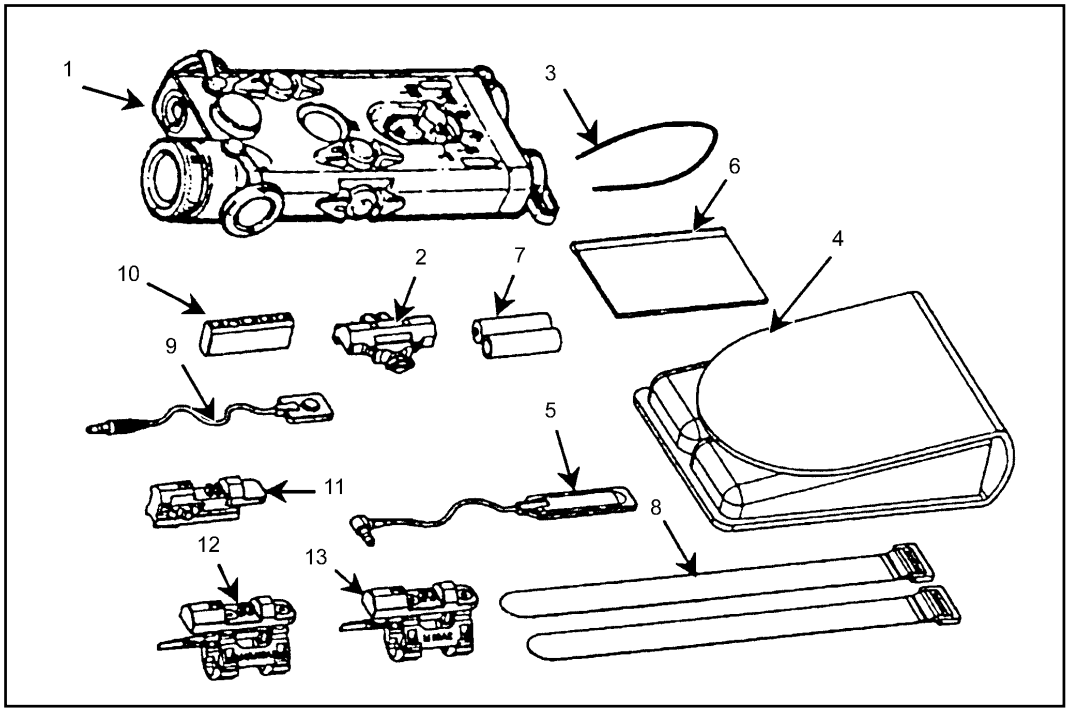
- Rotate the locking latch counter clockwise to disengage the latch shaft.
- Swing pivot bracket away from around the AT4.

F-2. AN/PEQ-2A TARGET POINTER/ILLUMINATOR/AIMING LIGHT

The AN/PEQ-2A target pointer/illuminator/aiming light (TPIAL) (Figure F-6) is a Class IIIb laser that emits a collimated beam of infrared light for precise aiming of the weapon as well as a separate infrared illuminating beam with adjustable focus. A safety block is provided for training purposes (blue side), which limits the operator from selecting the high power modes (black side). The TPIAL projects an infrared laser beam that cannot be seen with the eye but can be seen with night vision devices. It is also capable of projecting a much wider infrared illuminating beam from an integral illuminator. The TPIAL works with night vision goggles and mounts on various weapons with mounting brackets and adapters. The AN/PEQ-2A can also be used in the hand-held mode to illuminate and designate targets by leaders.

a. **Technical Data**.

Weight:	7.5 ounce (with 2 AA batteries)
Length:	16.26 centimeters (6.4 inches)
Width:	7.12 centimeters (2.8 inches)
Height:	3.05 centimeters (1.2 inches)
Range:	600 meters in low power (eye safe)
	2,000 meters in high power (non-eye safe)
Output Power:	
Aiming laser	25 m W (+- 10%)
Illuminator	30 m W (+50,-20%)
Beam Divergence:	
Aiming laser	.5 m rad
Illuminator	1.0-115 m rad
Batteries:	2 x 1.5V AA batteries



(1) TPIAL ASSEMBLY WITH SAFETY BLOCK
(2) RAIL
(3) NECK CORD
(4) TEXTILE BAG
(5) CABLE SWITCH, 12-INCH, MEMBRANE
(6) OPERATOR'S MANUAL
(7) BATTERIES 1.5V AA
(8) STRAP, RETENTION
(9) CABLE SWITCH, 20-INCH, BUTTON
(10) BRACKET ADAPTER
(11) TRAINING EXTENDER (ARMY ONLY)
(12) M4/M16A2 BRACKET ASSEMBLY

Figure F-6. AN/PEQ-2A with accessories.

b. **Operation.** This paragraph describes the battery installation, the safety block installation, the mode switch, the button switch, the cable switch, the focus switch, the lens cap, and the boresight adjusters.

(1) ***Battery Installation*** (Figure F-7).

(a) Unscrew the battery caps and install two AA batteries.

(b) Orient the batteries as indicated by the markings on the AN/PEQ-2A body.

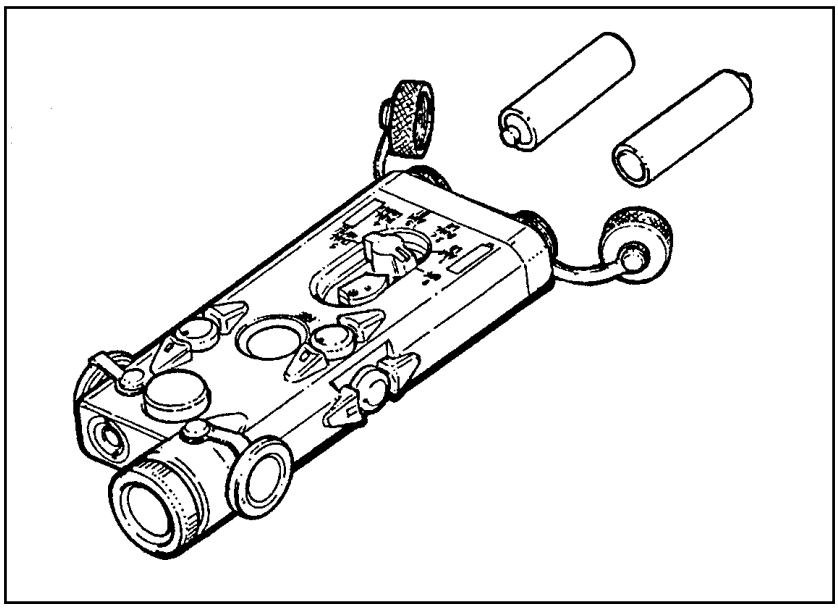


Figure F-7. AN/PEQ-2A battery installation.

(2) ***Safety Block Installation*** (Figure F-8). The safety block installed in the training mode (blue side up) prevents the operator from accessing the noneye safe modes (AIM HI, DUAL LO/HI, DUAL HI/HI). A .050 hex head Allen wrench is needed to unscrew the block from the body and reinstall it in the tactical mode (black side up).

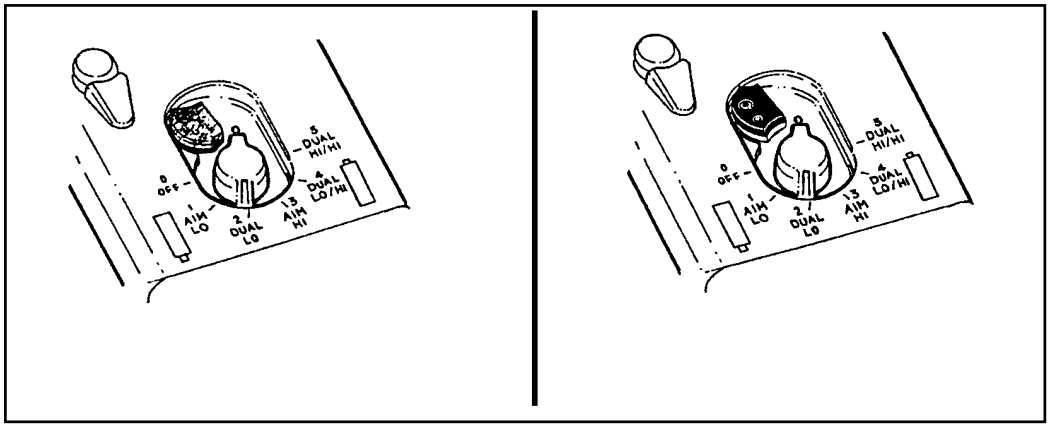


Figure F-8. Safety block installation.

(3) ***Mode Selector***. The mode selector is used to set the mode in which the AN/PEQ-2A operates when the cable switch button or push button are depressed. The mode selector has six positions (Table F-1).

KNOB POSITION	OPERATION
0 OFF	The AN/PEQ-2A will not operate.
1 AIM LO	The aiming beam operates at low power.
2 DUAL LO	The aiming beam operates at low power and the illuminating beam operates at low power.
3 AIM HI	The aiming beam operates at high power.
4 DUAL LO/HI	The aiming beam operates at low power and the illuminating beam operates at full power.
5 DUAL HI/HI	The aiming beam operates at high power and the illuminating beam operates at full power.

Table F-1. Mode selector positions.

(4) ***Button Switch*** (Figure F-9). The button switch is used when the AN/PEQ-2A is hand held. Pressing the button switch operates the AN/PEQ-2A in the operational mode set by the mode selector. When the button is released, the AN/PEQ-2A turns off.

(a) A green light emitting diode (LED) is incorporated into the body of the AN/PEQ-2A to indicate that the AN/PEQ-2A is ON. Whenever the AN/PEQ-2A is activated, the green LED will light and stay lit until the unit is turned OFF.

(b) If continuous operation of the AN/PEQ-2A is desired, pressing the button switch twice in rapid succession will latch the AN/PEQ-2A ON. The AN/PEQ-2A will remain on until the push button is pressed a third time.

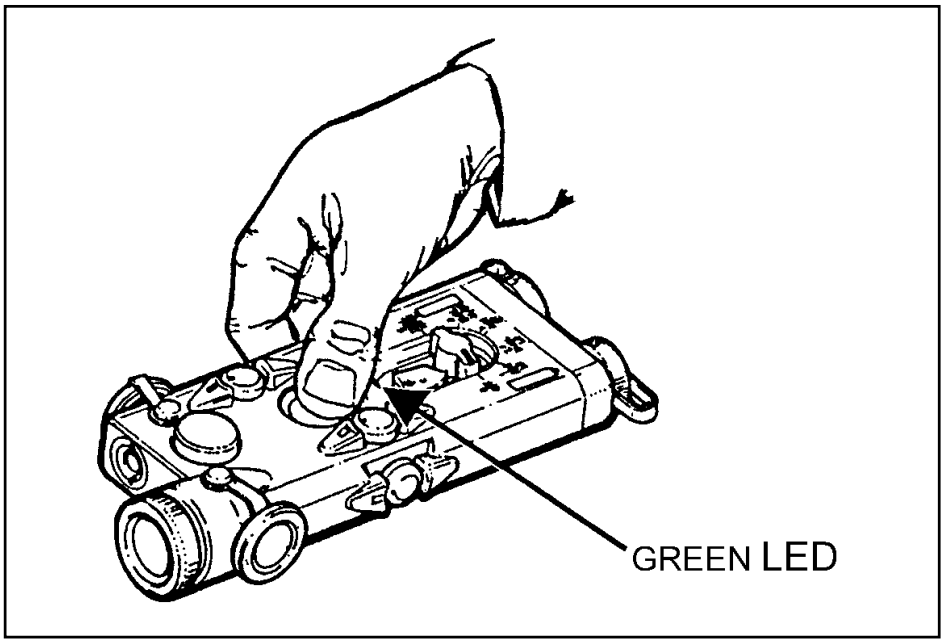


Figure F-9. Operation of the button switch.

(5) ***Cable Switch*** (Figure F-10). The cable switch is used when the AN/PEQ-2A is mounted on a weapon. The cable switch plugs into the back of the AN/PEQ-2A

assembly. Pressing the button or pad at the end of the cable switch causes the AN/PEQ-2A to turn on in the operational mode selected by the mode select switch. When the button is released, the AN/PEQ-2A turns off.

(a) If continuous operation of the AN/PEQ-2A is desired, pressing the cable switch twice in rapid succession will latch the AN/PEQ-2A ON. The AN/PEQ-2A will remain on until the push button is pressed a third time.

(b) When the cable switch plug is installed in the AN/PEQ-2A, it automatically locks into place. To remove the switch, pull back on the plug sleeve and pull the plug out. DO NOT TRY TO REMOVE THE PLUG BY PULLING ON THE CABLE.

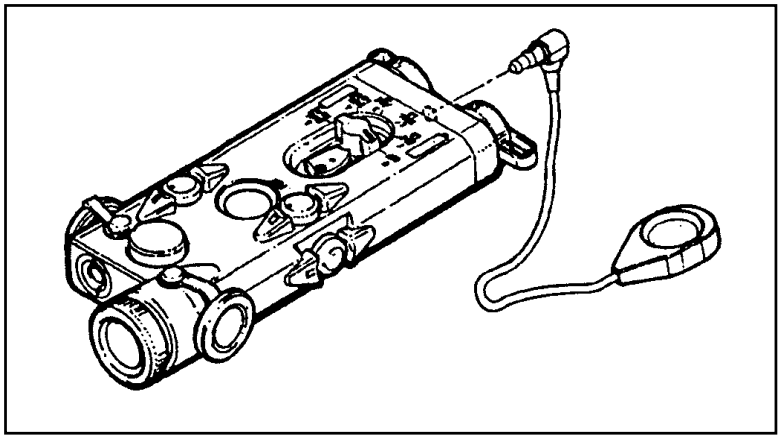


Figure F-10. Installation of the cable switch.

(6) ***Focus Knob*** (Figure F-11). The focus knob is used to vary the spread of the illumination beam based on the range and size of the area to be illuminated.

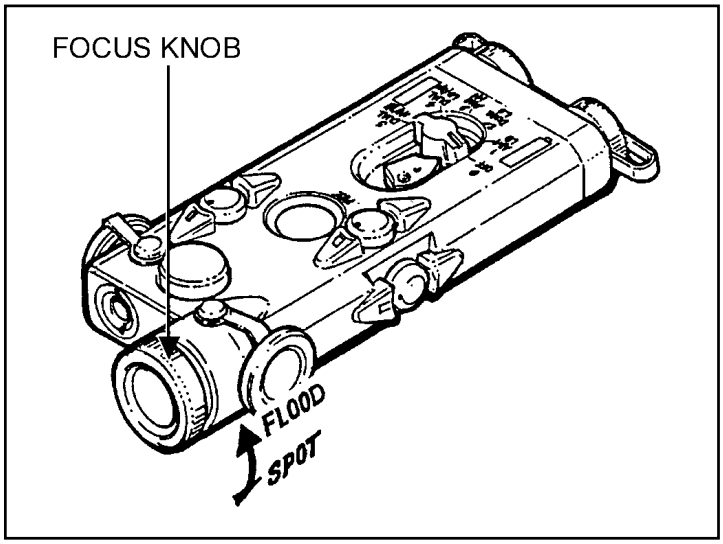


Figure F-11. Using the focus knob.

(7) ***Lens Cap*** (Figure F-12).

(a) The *black lens cap* blocks the AN/PEQ-2A illuminator or aiming laser beam should the device be activated. To use the black lens cap, pull it from its stored location on the side of the AN/PEQ-2A and stretch it over the front of the focus knob or aiming beam so that it fits snugly in place.

(b) The *diffuser lens cap* enables the illuminator or aiming laser to emit in a 45-degree cone (10 feet at 10 feet). To use the diffuser lens cap, pull it from its stored location on the side of the AN/PEQ-2A and stretch it over the front of the focus knob or aiming beam so that it fits snugly in place.

(c) The *neutral density lens cap* enables the AN/PEQ-2A illuminator or aiming laser to be operated in low power. To use the neutral density lens cap, pull it from its stored location on the side of the AN/PEQ-2A and stretch it over the front of the focus knob or aiming beam so that it fits snugly in place.

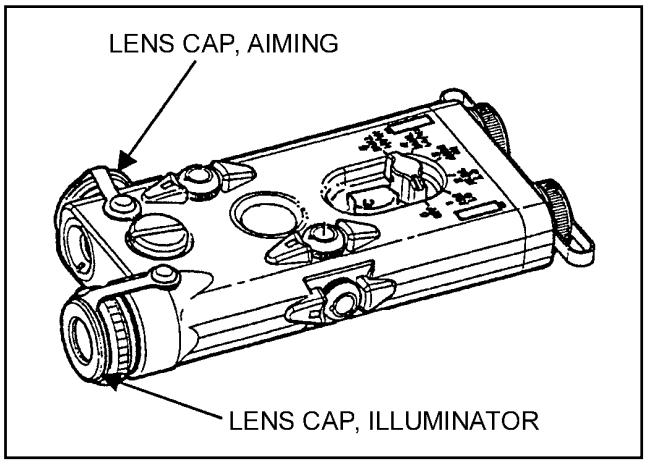


Figure F-12. Installing the lens caps.

(8) ***Boresight Adjusters*** (Figure F-13). The AN/PEQ-2A is equipped with boresight adjusters for zeroing the aiming beam and illumination beam. The AN/PEQ-2A adjusters move the beams in true horizontal and vertical directions. When zeroing the AN/PEQ-2A, it is best to zero the aiming beam to the weapon and then align the illumination beam to the aiming beam.

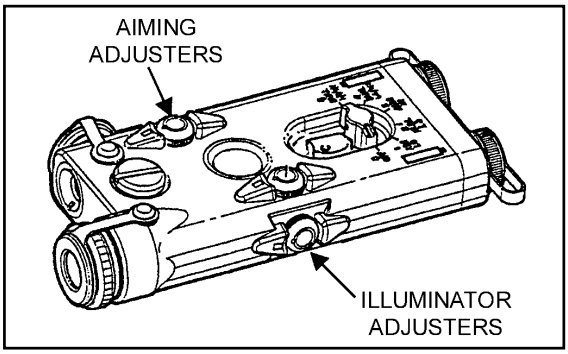


Figure F-13. Boresight adjusters.

F-3. AN/PAS-13 (V2) MEDIUM WEAPON THERMAL SIGHT and AN/PAS-13 (V3) HEAVY WEAPON THERMAL SIGHT

The AN/PAS-13 (V2) medium weapon thermal sight (MWTS) and the AN/PAS-13 (V3) heavy weapon thermal sight (HWTS) (Figure F-14) are silent, lightweight, compact, and durable battery-powered infrared imaging sensors that operate with low battery consumption.

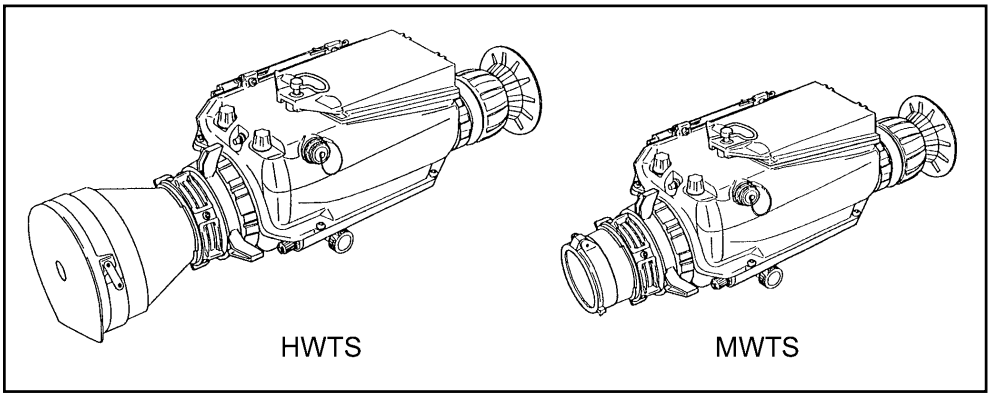


Figure F-14. HWTS and MWTS models of the thermal weapon sight.

a. **Description.**

(1) Both the MWTS and the HWTS are referred to as singular thermal weapon sights (TWS). The TWS is capable of target acquisition under conditions of limited visibility such as darkness, smoke, fog, dust, and haze. The TWS operates effectively at night and can also be used during the daytime. Infrared light is received through the telescope, detected by an IR sensor, converted to digital data, processed, and then displayed for the user. The TWS is composed of two functional groups: the telescope and the basic sensor.

(a) *Telescope*. The telescope receives IR light emitting from an intended target and its surroundings. The telescope magnifies and projects the IR light onto the scanner on the basic sensor (Figure F-15).

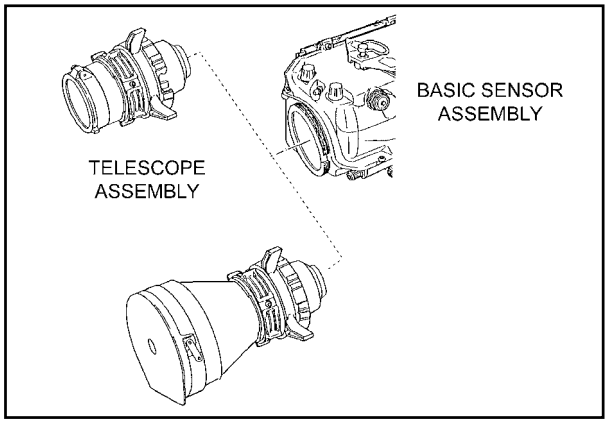


Figure 3-6. TWS configurations.

(b) *Basic sensor*. The scanner reflects the IR light received from the telescope onto the detective assembly. The detective assembly senses the IR light and converts it to video. The sensor's electronics condition the video for display on the LED array. The LED array illuminates the IR image along with the reticle. The light from the LED array is reflected off the scanner to form an image at the eyepiece.

(2) The only difference between the MWTS and the HWTS are the telescopes, which are different magnifications and hold different reticles. The basic sensor on the two models is the same. The MWTS fits the M4 carbine, the M4 modular weapon system, the M16A2, the M16A4 (not shown), the M249, the M60 machine gun, the M240B machine gun (not shown), and the M136 grenade launcher (Figure F-16). The HWTS fits the squad leader's M16, the M24 sniper rifle, the M2, caliber .50 machine gun, and the MK-19 grenade launcher (Figure F-17).

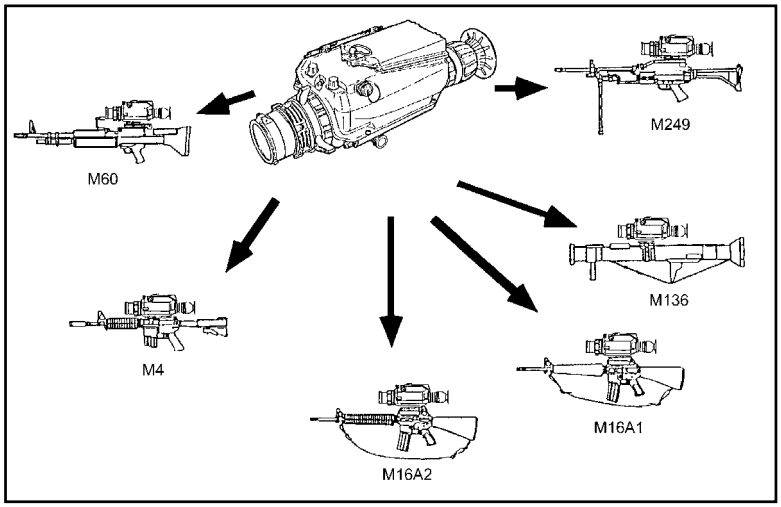


Figure F-16. MTWS.

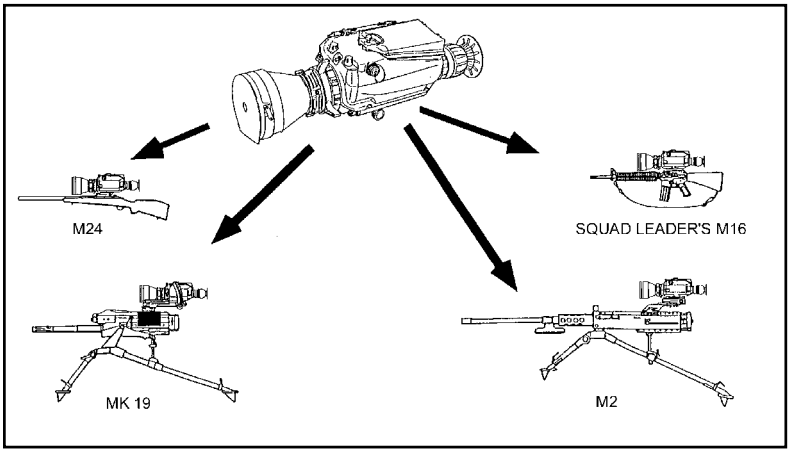


Figure F-17. HTWS.

b. **Technical Data**.

	MWTS	HWTS
Field of view (FOV):		
Narrow	9 degrees	3 degrees
Wide	15 degrees	9 degrees
Telescope magnification:		
Narrow FOV	3.3X	10X
Wide FOV	2X	3.3X
Length:	15.5 inches	18 inches
Width:	6.25 inches	6.25 inches
Height:	6.25 inches	6.25 inches
Weight	4.1 pounds	4.5 pounds
Power consumption:		
ON mode	12.0 watts	12.0 watts
STANDBY mode	5.5 watts	5.5 watts
Battery life:		
71% STANDBY mode	10 hours	10 hours
EMERGENCY mode	3.5 hours	3.5 hours

c. **Operation.**

(1) The TWS has three modes of operation: STANDBY, ON, and EMERGENCY.

(a) STANDBY mode. When the system is first turned on, the TWS begins a cool down period of approximately two minutes. After the cool down period, the TWS enters the STANDBY mode. During the STANDBY mode, power is not applied to the scanner or display in order to extend the life of the battery.

(b) ON mode. When the TWS is in the STANDBY mode and pressure is applied to the eyecup, the TWS switches to the ON mode, and a switch engages to provide power to the scanner and display. After a three-second delay, the system is fully operational.

(c) EMERGENCY mode. When switched to the EMERGENCY mode, the TWS continuously applies power to the entire system. This allows the operator to bypass the three-second delay experienced when switching from the STANDBY to the ON mode. Since power is applied to the entire system while in the emergency mode, battery life is greatly reduced.

(2) Controls and indicators are as shown in Figure 3-18.

(a) The BRIGHTNESS CONTROL is a nine-position rotary switch with an off detent position (turned fully counterclockwise). The purpose is to turn the system on or off and adjust the brightness of the eyepiece display.

(b) The CONTRAST CONTROL adjusts the contrast of the thermal image displayed on the raster. It has an automatic and a manual mode.

(c) The FOCUS RING adjusts the telescope focus from 20 meters to infinity. It requires a manual adjustment and affects both the wide and narrow fields of view.

(d) The FIELD OF VIEW RING is located on the telescope. It has a wide and a narrow field of view. The wide FOV is for using low magnification during target detection, and the narrow FOV is for using high magnification during recognition and engagement.

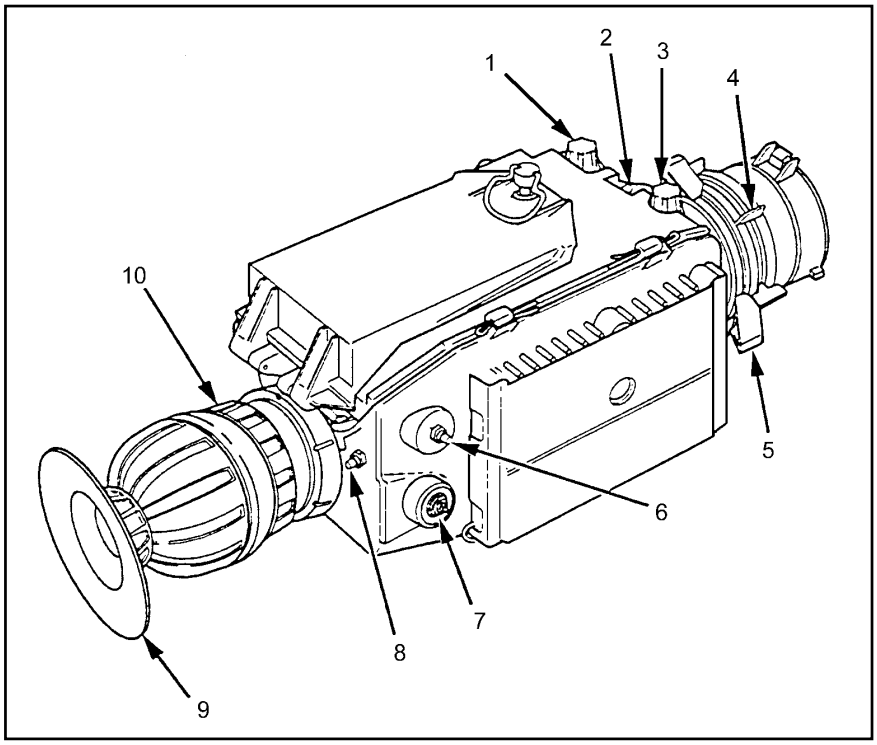
(e) The RETICLE SELECT SWITCH selects one of the available reticles depending on the TWS model (medium or heavy). It must be held for two seconds to enable reticle

changes. After two seconds, release the switch to cycle to the next reticle. This control is disabled after ten seconds of inactivity.

(f) The RETICLE ADJUST SWITCH adjusts the reticle aiming features in azimuth and elevation. It is used during zeroing, and it must be held for two seconds to allow changes to be made. After two seconds, each press moves the reticle aiming features one increment. This control is also disabled after ten seconds of inactivity.

(g) The BLACK/WHITE POLARITY SWITCH selects the polarity of the thermal image displayed on the raster. The initial setting is "white hot." The polarity switch affects the appearance of the target.

(h) The DIOPTER FOCUS RING adjusts the focus of the raster and indicators to the operator's eye. It ranges from +2 to -6 diopters.



(1) BRIGHTNESS CONTROL
(2) EMERGENCY SWITCH CONTROL
(3) CONTRAST CONTROL
(4) FOCUS RING
(5) FIELD OF VIEW RING
(6) RETICLE SELECT SWITCH
(7) RETICLE ADJUST SWITCH
(8) BLACK/WHITE POLARITY SWITCH
(9) EYECUP
(10) DIOPTER FOCUS RING

Figure F-18. TWS controls and indicators.

(i) The EYEPIECE INDICATORS (Figure F-19) illuminate as follows:

- NOT COOL when the detectors are not cool enough for proper operation.
- WHT HOT/BLK HOT polarity.
- EMER during emergency mode operation.
- LOW when battery power has approximately fifteen minutes of useful power left.

(j) The COOLDOWN PERIOD INDICATORS blink the first ten seconds after the system is turned on. After ten seconds, the NOT COOL indicator is lit and the POLARITY, EMERGENCY, and LOW BATTERY indicators function normally.

(k) The DISPLAY RASTER displays the thermal image with a superimposed reticle.

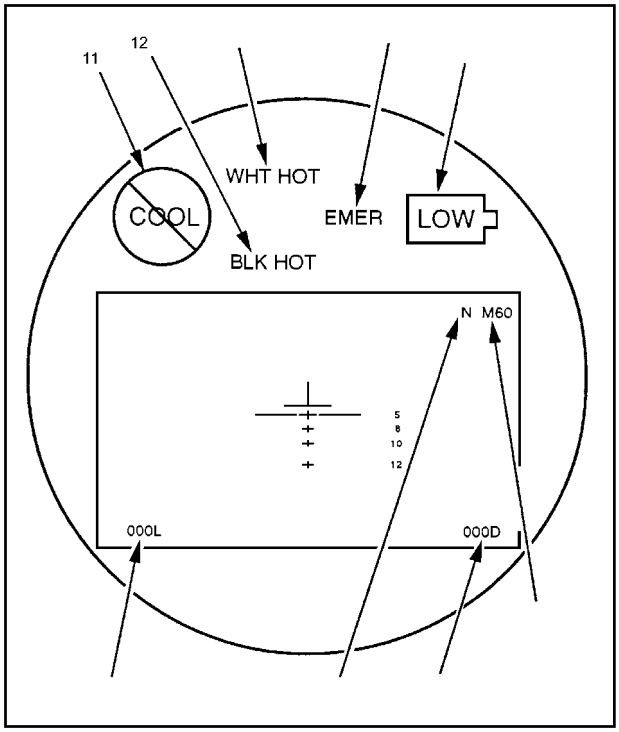


Figure F-19. Eyepiece indicators.

F-4. M136 AT4/M287 AT4 SUBCALIBER TRACER TRAINER SIGHT ALIGNMENT PROCEDURES

The fundamentals of marksmanship are the same as during the daytime with two exceptions. When using aided vision devices, the firer should hold the mounting bracket with the left hand. This method provides greater stability and helps to balance the AT4 against the added weight of the sight. When aiming the AT4, remember to aim by placing the infrared aiming light center mass on the target.

WARNING

When firing the M136 AT4, do not place your face within 3 inches of the mounted sight. The recoil of the AT4 could cause injury you or damage to the equipment.

a. Select a stable position for the weapon.

b. Open the M136 front and rear sight covers. During limited visibility conditions, the 7-millimeter peephole may be necessary for zeroing.

c. Set the rear sight for 200 meters and choose the appropriate scenario.

(1) Place a 25 meter zero target with a predetermined offset at 10 meters and align the weapon's fixed sight to coincide with the 4-centimeter aiming point of the zero target.

(2) Select a suitable target at 200 meters and align the weapon's fixed sight center mass of the target.

d. Turn on the infrared aiming light. Use the AN/PVS-7B or AN/PVS-14 to observe the infrared aiming light (without moving the weapon).

e. Adjust the infrared aiming light so that it coincides with the 2-centimeter offset aiming point of the 25-meter zero target. If the 200-meter method is used, adjust the aiming point of the mounted sight to coincide center mass on the 200-meter target.

f. Repeat the procedure until the aiming light is sight aligned to the weapon by adjusting the controls on the AN/PAQ-4C.

NOTE: Use the same procedures to conduct sight alignment of the AN/PEQ-2.

g. Conduct a preventive maintenance inspection before the instructional and qualification tables are fired. Once the soldiers have completed Tables I and III (day tables), they receive additional instruction on the use of aided vision devices for night operations.

(1) ***Table I (Instructional Day)***. This scenario consists of 12 targets from 100 to 300 meters. The standard to proceed to the next table is 6 out of 12 targets successfully engaged.

(2) ***Table II (Instructional Night)***. This scenario consists of 12 targets from 100 to 300 meters. The standard to proceed to the next table is 6 out of 12 targets successfully engaged at night.

(3) ***Table III (Qualification Day)***. This scenario consists of 10 targets from 100 to 300 meters. The standard to proceed to the next table is 8 out of 10 targets successfully engaged.

(4) ***Table IV (Qualification Night)***. This scenario consists of 10 targets from 100 to 300 meters. The standard to proceed to the next table is 6 out of 10 targets successfully engaged.

h. The night sustainment training strategy should be conducted over a one-day time frame and consists of the following:

(1) ***Night Vision Goggles Familiarization Training***. Soldiers receive instruction on the proper use and fit of night vision goggles, to include characteristics and capabilities, maintenance, and mounting procedures.

(2) ***Infrared Aiming Light Familiarization Training***. Soldiers boresight the weapon and aided vision device at a range of 10 meters.

(3) ***Fundamentals of Firing (Body Position with Head Harness and NVD, Foxhole and Prone)***. Soldiers review and practice firing positions and fundamentals of marksmanship and any changes that may occur by use of the infrared aiming device.

(4) ***Weapon and Equipment Precombat Inspection***. The weapon and infrared aiming device is inspected and properly mounted. Inspect to ensure that the infrared aiming

device is mounted securely to the mount and that the mount is tightly secured to the weapon. A review of clearing or misfire procedures is important.

(5) ***Infrared Aiming Light Boresight to Weapon***. Each soldier boresights the weapon and infrared aiming device at a range of 10 meters. If a bore light is not available, then zero the weapon and sight by using the specified zeroing procedure for that weapon/sight combination.

GLOSSARY

AC	Active Component
ANCOC	advanced noncommissioned officer course
AN/PVS	Army Navy passive vision sight
ARTEP	Army Training and Evaluation Program
backblast	The backward blast created by igniting the propellant in a weapon designed to be as recoilless as possible.
blast	An explosive or violent detonation that produces a direct effect on its target in addition to radiant heat and overpressure at its point of origin.
BMP	a type of non-US fighting vehicle built by the former Soviet Union
BNCOC	basic noncommissioned officer course
BRDM	a type of non-US scout car built by the former Soviet Union
BTR	a type of non-US personnel carrier built by the former Soviet Union
C	Centigrade
CS	combat support
CSS	combat service support
DA	Department of the Army
DKIE	decontamination kit individual equipment
DOD	Department of Defense
DS	direct support
F	Fahrenheit
FHT	field handling trainer

fps	feet per second
FTX	field training exercise
HE	high-explosive
HEAT	high-explosive antitank
HELLFIRE	heliborne laser fire and forget (a missile system)
HMTS	medium weapon thermal sight
HWTS	heavy weapon thermal sight
IAW	in accordance with
IET	initial entry training
IR	infrared
kmph	kilometers per hour
LAW	light antitank weapon
LED	light emitting diode
METL	mission-essential task list
MILES	Multiple Integrated Laser Engagement System
mm	millimeter(s)
MMTT	manned moving target tank
MOPP	mission-oriented protective posture
MOUT	military operations on urbanized terrain
mph	miles per hour
mps	meters per second
MTP	mission training plan

MWTS	medium weapon thermal sight
NA	not applicable
NATO	North Atlantic Treaty Organization
NBC	nuclear, biological, chemical
NCO	noncommissioned officer
NSN	national stock number
NVD	night vision device
OIC	officer in charge
overpressure	increased atmospheric pressure (positive overpressure), followed by a wave of decreased atmospheric pressure (negative overpressure), produced around the origin of an explosive or violent detonation
PLDC	primary leadership development course
POI	program of instruction
promethium	a radioactive metallic element of the rare-earth group used to illuminate range markings on the front sight of the M72-series LAW
RC	Reserve Component
RPG	rocket-propelled grenade (non-US)
STX	situational training exercise
SMCT	soldier's manual of common tasks
SOP	standing operating procedure
spall	small fragment or chip
STP	soldier training publication

STRAC	standards in training commission
TOC	tactical operations center
TP	training-practice
TPIAL	target pointer/illuminator/aiming light, AN/PEQ-2A
TRADOC	(US Army) Training and Doctrine Command
trc	track (as used in STRAC manual)
TRP	target reference point
TSC	training support center
TWS	thermal weapon sight

PREFACE

This manual provides technical information, training techniques, and combat techniques of light antiarmor weapons. Intended users include leaders and designated soldiers who will use this information to successfully integrate light antiarmor weapons into combat operations. This manual discusses gunnery training and train-the-trainer.

The tactical positions shown in this manual were drawn to enhance the reader's understanding of related subject material and do not necessarily represent the best employment option for that material.

Unless this publication states otherwise, masculine nouns and pronouns do not refer exclusively to men.

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lusanoh@benning.army.mil

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M72-SERIES LAW SCORECARD

For use of this form, see FM 23-25; the proponent agency is TRADOC

NAME _____ SSN _____ DATE _____

GRADE _____ RATING _____ UNIT _____ WEATHER (circle one) CLEAR RAIN FOG SNOW

DATA REQUIRED BY THE PRIVACY ACT OF 1974

AUTHORITY: 10 USC 3012(g) / Executive Order 9397 **PRINCIPAL PURPOSE(S):** Record individual performance. **ROUTINE USES:** Evaluate individual proficiency and determine proficiency level. SSN is used for positive identification purposes only. **MANDATORY OR VOLUNTARY DISCLOSURE AND EFFECT ON INDIVIDUAL NOT PROVIDING INFORMATION:** Voluntary. Individuals not providing information cannot be rated/scored on a mass basis.

TABLE	TYPE OF FIRE	TYPE OF TARGET	ROUND	RANGE (M)	FIRING POSITION	HIT	MISS
1	Instructional DAY	Stationary	1	125 to 150	Standing	___	___
			2	150 to 175	Kneeling	___	___
			* 3	150 to 200	Sitting	___	___
			* 4	125 to 150	Prone	___	___
					Table Subtotals	___	___
2	Instructional DAY	Moving	1	100 to 200	Standing	___	___
			2	100 to 200	Sitting	___	___
			* 3	100 to 200	Kneeling	___	___
					Table Subtotals	___	___
3	Instructional NIGHT	Stationary	1	100 to 150	Kneeling	___	___
			2	100 to 150	Sitting	___	___
			* 3	100 to 150	Sitting	___	___
					Table Subtotals	___	___

FIRER'S SIGNATURE _____ DATE _____ SCORER'S SIGNATURE _____ DATE _____

FIRER'S SIGNATURE _____ DATE _____ SCORER'S SIGNATURE _____ DATE _____

FIRER'S SIGNATURE _____ DATE _____ SCORER'S SIGNATURE _____ DATE _____

* Firer must wear a protective mask when firing this round.

CONSOLIDATED SCORES

FIRER'S SIGNATURE _____ DATE _____ TOTAL MISSES _____

SCORER'S SIGNATURE _____ DATE _____ RANK _____

RANGE OIC'S SIGNATURE _____ DATE _____ RANK _____

INSTRUCTOR NOTES

ALL FIRING TABLES	• Do not announce the ranges to targets. • Fire all engagements in sequence.

DA Form 7323-R, JUL 94

M136 AT4 SCORECARD

For use of this form, see FM 23-25; the proponent agency is TRADOC

NAME _____ SSN _____ DATE _____

GRADE _____ RATING _____ UNIT _____ WEATHER (circle one) CLEAR RAIN FOG SNOW

DATA REQUIRED BY THE PRIVACY ACT OF 1974

AUTHORITY: 10 USC 3012(g) / Executive Order 9397. **PRINCIPAL PURPOSE(S):** Record individual performance. **ROUTINE USES:** Evaluate individual proficiency and determine proficiency level. SSN is used for positive identification purposes only. **MANDATORY OR VOLUNTARY DISCLOSURE AND EFFECT ON INDIVIDUAL NOT PROVIDING INFORMATION:** Voluntary. Individuals not providing information cannot be rated/scored on a mass basis.

TABLE	TYPE OF FIRE	TYPE OF TARGET	ROUND	RANGE (M)	FIRING POSITION	HIT	MISS
1	Instructional Day	Stationary	1	150 to 200	Kneeling	___	___
		Stationary	* 2	150 to 200	Kneeling	___	___
		Stationary	3	250 to 300	Sitting	___	___
		Stationary	4	250 to 300	Sitting	___	___
		Stationary	5	125 to 150	Prone	___	___
		Stationary	6	125 to 150	Prone	___	___
		MMTT/MAS	7	150 to 200	Kneeling	___	___
		MMTT/MAS	* 8	150 to 200	Kneeling	___	___
		MMTT/MAS	9	200 to 250	Standing	___	___
		MMTT/MAS	*10	200 to 250	Fighting position, unsupported	___	___
		MMTT/MAS	11	250 to 300	Kneeling	___	___
		MMTT/MAS	12	250 to 300	Kneeling	___	___
					Table Subtotals	___	___

FIRER'S SIGNATURE _____ DATE _____ SCORER'S SIGNATURE _____ DATE _____

TABLE	TYPE OF FIRE	TYPE OF TARGET	ROUND	RANGE (M)	FIRING POSITION	HIT	MISS
2	Instructional Night	Stationary	1	125 to 150	Prone	___	___
		Stationary	2	125 to 150	Prone	___	___
		Stationary	* 3	150 to 200	Sitting	___	___
		Stationary	4	150 to 200	Sitting	___	___
		Stationary	5	250 to 300	Kneeling	___	___
		Stationary	6	250 to 300	Kneeling	___	___
		MMTT/MAS	7	125 to 150	Standing	___	___
		MMTT/MAS	8	125 to 150	Standing	___	___
		MMTT/MAS	* 9	200 to 250	Kneeling	___	___
		MMTT/MAS	10	200 to 250	Kneeling	___	___
		MMTT/MAS	11	150 to 200	Standing	___	___
		MMTT/MAS	12	150 to 200	Fighting position, unsupported	___	___
					Table Subtotals	___	___

FIRER'S SIGNATURE _____ DATE _____ SCORER'S SIGNATURE _____ DATE _____

* Firer must wear a protective mask when firing this round.

INSTRUCTOR NOTES	
ALL FIRING TABLES	• Do not announce the ranges to targets. • Fire all engagements in sequence. • Fire Table 1 before Table 3; fire Table 2 before Table 4.
FIRING TABLES 2 THROUGH 5	• Ensure no one fires at front or rear of a manned moving tank target. • Total hits and misses, and enter results in the consolidated scores block on the back of this scorecard.

DA Form 7324-R, JUL 94 (FRONT)

M136 AT4 SCORECARD

TABLE	TYPE OF FIRE	TYPE OF TARGET	ROUND	RANGE (M)	FIRING POSITION	HIT	MISS
		Stationary	1	125 to 150	Standing	___	___
		Stationary	2	150 to 200	Kneeling	___	___
		Stationary	* 3	200 to 250	Sitting	___	___
3	Qualification Day	Stationary	4	250 to 300	Sitting	___	___
		MMTT/MAS	5	125 to 150	Kneeling	___	___
		MMTT/MAS	6	150 to 200	Fighting position, unsupported	___	___
		MMTT/MAS	* 7	200 to 250	Sitting	___	___
		MMTT/MAS	8	250 to 300	Kneeling	___	___
					Table Subtotals	___	___

FIRER'S SIGNATURE _____ DATE _____ SCORER'S SIGNATURE _____ DATE _____

		Stationary	* 1	125 to 150	Standing or Prone	___	___
		Stationary	2	200 to 250	Kneeling	___	___
4	Qualification Night	Stationary	3	250 to 300	Sitting	___	___
		MMTT/MAS	4	150 to 200	Sitting	___	___
		MMTT/MAS	* 5	125 to 150	Kneeling	___	___
		MMTT/MAS	6	200 to 250	Fighting position, unsupported	___	___
					Table Subtotals	___	___

FIRER'S SIGNATURE _____ DATE _____ SCORER'S SIGNATURE _____ DATE _____

		Sequence	1		Sitting	___	___
		Sequence	2		Sitting	___	___
5	Advanced Instructional	Pair	3		Kneeling	___	___
		Pair	4		Kneeling	___	___
		Volley	5		Kneeling	___	___
		Volley	* 6		Sitting	___	___
					Table Subtotals	___	___

FIRER'S SIGNATURE _____ DATE _____ SCORER'S SIGNATURE _____ DATE _____

* Firer must wear a protective mask when firing this round.

QUALIFICATION CRITERIA — BASED ON TOTAL HITS FOR TABLES 3 AND 4

FIRST CLASS ..... 13 HITS
SECOND CLASS ..... 11 HITS
THIRD CLASS ..... 9 HITS
UNQUALIFIED ..... FEWER THAN 9 HITS

CONSOLIDATED SCORES

INSTRUCTIONAL TOTALS (TABLES 1 AND 2): HITS _____ MISSES _____ CLASS RATING, TABLES 1 AND 2: _____

QUALIFICATION TOTALS (TABLES 3 AND 4): HITS _____ MISSES _____ OVERALL TOTALS HITS _____ MISSES _____

FIRER'S SIGNATURE _____ DATE _____ SCORER'S SIGNATURE _____ DATE _____

RANGE OIC'S SIGNATURE _____ RANK _____ DATE _____

DA Form 7324-R, JUL 94 (BACK)

REFERENCES

SOURCES USED
These are the sources quoted or paraphrased in this manual.

TM 9-1055-886-12&P	Operator and Unit Maintenance Manual for M287 9-MM Tracer Bullet Training Device. 25 October 1989.
TM 9-1315-886-12	Operator's and Unit Maintenance Manual for Launcher and Cartridge, 84 Millimeter: M136 (AT4). 15 May 1990.
TM 9-1340-214-10	Operator's Manual for 66-MM Light Antitank Weapon (LAW) System M72A1, M72A2 with Coupler, M72A3, and Practice Rocket Launcher M190 with M73 Practice Rocket. 20 February 1992.
TM 11-5855-213-10	Operator's Manual for Night Vision Sight, Individual-Served Weapon AN/PVS-4. 1 February 1993.
TM 11-5855-213-23&P	Unit and Direct Support Maintenance Manual for Night Vision Sight, Individual-Served Weapon, AN/PVS-4. 1 June 1993.

DOCUMENTS NEEDED
These documents must be available to the intended users of this publication.

DA Form 7323-R	M72-Series LAW Scorecard. July 1994.
DA Form 7324-R	M136 AT4 Scorecard. July 1994.
DA Pamphlet 350-38	Standards in Weapons Training. 3 July 1997.
*DOD 5100.76-M	Physical Security of Sensitive Conventional Arms, Ammunition, and Explosives. 3 February 1983.
FM 7-7	The Mechanized Infantry Platoon and Squad (APC). 15 March 1985.
FM 7-7J	The Mechanized Infantry Platoon and Squad (Bradley). 7 May 1993.
FM 7-8	The Infantry Platoon and Squad. 1 March 2001.
FM 25-101	Battle Focused Training. 30 September 1990.

GTA 7-2-5	Sight Engagement Trainer, AT4 (Parts 1 and 2). 2 January 1990.
GTA 17-2-13	Armored Vehicle Recognition. 1 May 1987.
STP 7-11BCHM1-SM-TG	Soldier's Manual and Trainer's Guide, Skill Level 1, CMF11, Infantry. 19 June 2000.
STP 7-11BCHM14-SM-TG	Soldier's Manual and Trainer's Guide, Skill Level 2/3/4, MOS 11B, 11C, 11H, and 11M, Skill Levels 1/2/3/4. 19 June 2000.
STP 21-1-SMCT	Soldier's Manual of Common Tasks, Skill Level 1. 1 October 1994.
TC 90-1	Training for Military Operations on Urbanized Terrain. 30 September 1993.

READINGS RECOMMENDED

These readings contain relevant supplemental information.

AR 190-11	Physical Security of Arms, Ammunition, and Explosives. 30 September 1993.
AR 385-63	Policies and Procedures for Firing Ammunition for Training, Target Practice, and Combat. 15 October 1983.
FM 3-5	NBC Decontamination. 28 July 2000.
FM 5-250	Explosives and Demolitions. 30 June 1998.
FM 20-3	Camouflage, Concealment, and Decoys. 30 August 1999.
FM 90-5 (HTF)	Jungle Operations (How to Fight). 16 August 1982.
FM 90-10-1	An Infantryman's Guide to Combat in Built-Up Areas. 3 October 1995.

MCRP 3-01A

Rifle Marksmanship

U.S. Marine Corps

PCN 144 000091 00

To Our Readers

Changes: Readers of this publication are encouraged to submit suggestions and changes that will improve it. Recommendations may be sent directly to Commanding General, Marine Corps Combat Development Command, Doctrine Division (C 42), 3300 Russell Road, Suite 318A, Quantico, VA 22134-5021 or by fax to 703-784-2917 (DSN 278-2917) or by E-mail to **morgann@mccdc.usmc.mil**. Recommendations should include the following information:

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Unless otherwise stated, whenever the masculine gender is used, both men and women are included.

DEPARTMENT OF THE NAVY
Headquarters United States Marine Corps
Washington, D.C. 20380-1775

29 March 2001

FOREWORD

1. PURPOSE

Marine Corps Reference Publication (MCRP) 3-01A, *Rifle Marksmanship,* provides techniques and procedures for Marine Corps rifle marksmanship.

2. SCOPE

Every Marine is first and foremost a rifleman. MCRP 3-01A reflects this ethos and the Marine Corps' warfighting philosophy. This publication discusses the individual skills required for effective rifle marksmanship and standardizes the techniques and procedures used throughout the Marine Corps. It constitutes the doctrinal basis for all entry-level and sustainment-level rifle marksmanship training.

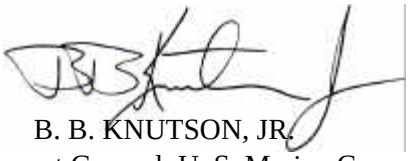
3. SUPERSESSION

MCRP 3-01A supersedes the discussion of rifle marksmanship in Fleet Marine Force Manual (FMFM) 0-8, *Basic Marksmanship,* and FMFM 0-9, *Field Firing for the M16A2 Rifle*. The discussion of pistol marksmanship in FMFM 0-8 remains in effect until it is superseded by MCRP 3-01B, *Pistol Marksmanship,* which is currently under development.

4. CERTIFICATION

Reviewed and approved this date.

BY DIRECTION OF THE COMMANDANT OF THE MARINE CORPS



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CHAPTER 1. INTRODUCTION TO RIFLE MARKSMANSHIP

All Marines share a common warfighting belief: "Every Marine a rifleman." This simple credo reinforces the belief that all Marines are forged from a common experience, share a common set of values, and are trained as members of an expeditionary force in readiness. As such, there are no "rear area" Marines, and no one is very far from the fighting during expeditionary operations. The Marine rifleman of the next conflict will be as in past conflicts: among the first to confront the enemy and the last to hang his weapon in the rack after the conflict is won.

1001. ROLE OF THE MARINE RIFLEMAN

Marine Corps forces are employed across the entire range of military operations. At one end is war, which is characterized by large-scale, sustained combat operations. At the other end of the scale are those actions referred to as military operations other than war (MOOTW). MOOTW focuses on deterring aggression, resolving conflict, promoting peace, and supporting civil authorities. These operations can occur before, during, and after combat operations. Training and preparation for MOOTW should not detract from the Corps' primary mission of training Marines to fight and win in combat. MOOTW normally does not involve combat. However, Marines always need to be prepared to protect themselves and respond to changing threats and unexpected situations. Whenever the situation warrants the application of deadly force, the Marine rifleman must be able to deliver well aimed shots to eliminate the threat. Sometimes the need for a well aimed shot may even be heightened by the presence of noncombatants in close proximity to the target. The proficient rifleman handles this challenge without unnecessarily escalating the level of violence or causing unnecessary collateral damage. The Marine rifleman must have the versatility, flexibility, and skills to deal with a situation at any level of intensity across the entire range of military operations.

To be combat ready, the Marine must be skilled in the techniques and procedures of rifle marksmanship and take proper care of his rifle. Even when equipped with the best rifle in the world, a unit with poorly trained riflemen cannot be depended upon to accomplish their mission. Usually, poorly trained riflemen either fail to fire their weapon or they waste ammunition by firing ineffectively. To send Marines into harm's way without thorough training in the use of their individual weapons carries undue risks for every Marine in the unit. On the other hand, well trained riflemen can deliver accurate fire against the enemy under the most adverse conditions. A well trained rifleman is not only confident that he can help his unit accomplish it's mission, he is confident that he can protect his fellow Marines and himself.

1002. CONDITIONS AFFECTING MARKSMANSHIP IN COMBAT

Many factors affect the application of marksmanship in combat; among them are—

- Most targets are linear in nature and will consist of a number of men or objects irregularly spaced along covered or concealed areas.
- Most targets can be detected by smoke, flash, dust, noise or movement, but will only be visible for a brief moment before taking cover.
- The nature of the target, irregularities of terrain and vegetation will often require a rifleman to use a position other than prone in order to fire effectively on the target.
- The time in which a target can be engaged is often fleeting.

1003. COMBAT MINDSET

In a combat environment, the Marine must be constantly prepared for possible target engagement. When a target presents itself in combat, there may be very little time to take action. A Marine must be able to engage the target quickly and accurately. The unique demands of combat (i.e., stress, uncertainty) dictate that the Marine be both physically and mentally prepared to engage enemy targets. It will not be enough to simply know marksmanship techniques and procedures. The Marine must develop the mental discipline

to prepare for enemy contact. In the confusion, noise, and stress of the combat environment, the Marine must have the ability to eliminate any hesitation, fear or uncertainty of action and to focus on the actions required to fire well-aimed shots. This is accomplished through establishment of a combat mindset. The key factors in the development of a combat mindset include both physical and mental preparation.

Physical Preparation

In combat, targets can present themselves without warning. Therefore, it is essential for the Marine to maintain proper balance and control of his weapon at all times so he can quickly assume a firing position, present the weapon, and accurately engage the target. However, speed alone does not equate to effective target engagement. The Marine should fire only as fast as he can fire accurately, never exceeding his physical ability to apply the fundamentals of marksmanship. To be effective in combat, the Marine must train to perfect the physical skills of shooting so those skills become second nature. Mastery of physical skills allow the Marine to concentrate on the mental aspects of target engagement; e.g., scanning for targets, detection of targets, selection and use of cover. The more physical skills that a Marine can perform automatically, the more concentration he can give to the mental side of target engagement.

Mental Preparation

While combat is unpredictable and constantly changing, the Marine can prepare himself mentally for confrontation with the enemy. The stress of battle, coupled with the often limited time available to engage targets, requires concentration on the mental aspects of target engagement; e.g., scanning for targets, detection of targets, and the selection and use of cover.

Knowledge of the Combat Environment

The Marine must be constantly aware of the surroundings to include the terrain, available cover, possible areas of enemy contact, backdrop of the target, etc. This awareness will enable the Marine to select and assume a firing position and to quickly and accurately engage targets.

Plan of Action

In combat, the situation will dictate the action to be taken. The Marine must understand the situation, identify and evaluate possible courses of action, and then develop a plan for target engagement that accomplishes the mission.

Confidence

The Marine must believe in his ability to engage targets accurately in any combat situation. A Marine's level of confidence is rooted in the belief that future challenges will be overcome—particularly the challenge of firing well aimed shots in a combat environment where the enemy may be returning fire. A key factor in a Marine's level of confidence is the degree to which he has mastered the techniques and procedures of the rifle marksmanship. Mastery of rifle marksmanship can only be obtained by quality instruction. Quality instruction is the foundation for practical application of the marksmanship fundamentals during range and field firing.

CHAPTER 2. INTRODUCTION TO THE M16A2 SERVICE RIFLE

Note

+The procedures in this manual are written for right-handed Marines; left-handed Marines should reverse instructions as necessary.

2001. DESCRIPTION

The M16A2 service rifle is a lightweight, 5.56 millimeter (mm), magazine-fed, gas-operated, air-cooled, shoulder-fired rifle. (Fig. 2-1 shows a right-side view and fig. 2-2, on page 2-2, shows the left-side view.) The rifle fires in either semiautomatic (single-shot) mode or a three-round burst through the use of a selector lever. The M16A2 service rifle has a maximum effective range of 550 meters for individual or point targets. The bore and chamber are chrome-plated to reduce wear and fouling. The handguards are aluminum-lined and are vented to permit air to circulate around the barrel for cooling purposes and to protect the gas tube. An aluminum receiver helps reduce the overall weight of the rifle. The trigger guard is equipped with a spring-loaded retaining pin that, when depressed, allows the trigger guard to be rotated out of the way for access to the trigger while wearing heavy gloves. An ejection port cover prevents dirt and sand from getting into the rifle through the ejection port. The ejection port cover should be closed when the rifle is not being fired. It is automatically opened by the action of the bolt carrier. The muzzle compensator serves as a flash suppressor and assists in reducing muzzle climb.

2002. OPERATIONAL CONTROLS

Selector Lever

The selector lever has three settings—safe, semi, and burst. The setting selected depends on the firing situation. See figure 2-3 on page 2-2.

Safe

The selector lever in the safe position prevents the rifle from firing.

Semi

The selector lever in the semi position allows one shot to be fired with each pull of the trigger.

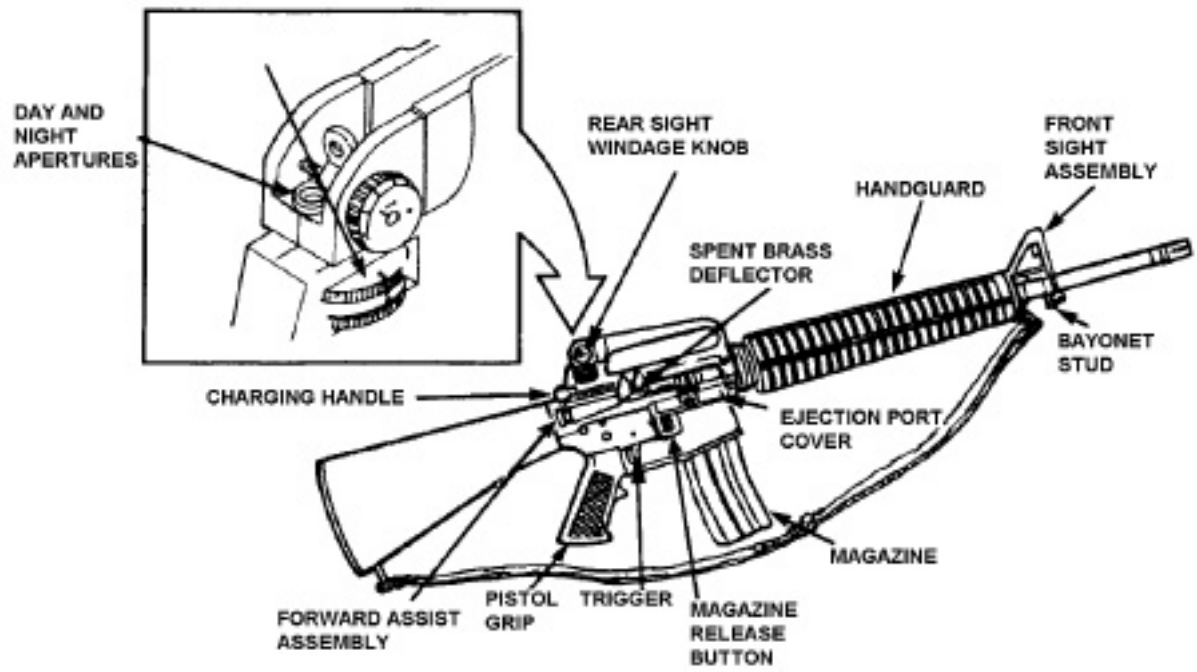


Figure 2-1. M16A2 Service Rifle (Right Side View).

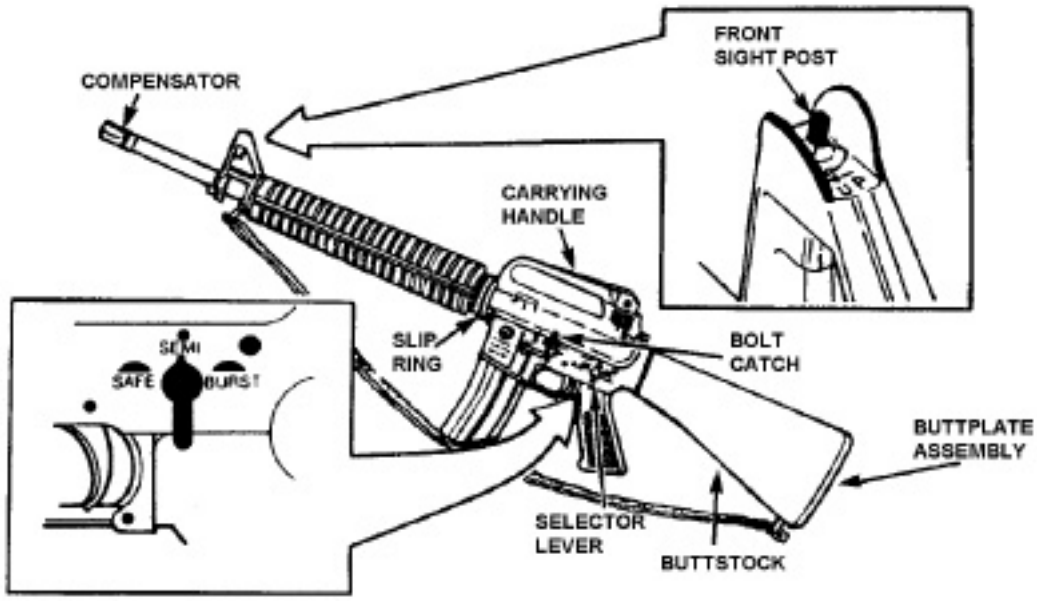


Figure 2-2. M16A2 Service Rifle (Left Side View).

Burst

The selector lever in the burst position allows the rifle to continue its cycle of operation until interrupted by the burst cam. With each pull of the trigger, the burst cam limits the maximum number of rounds fired to three. The burst cam is not "self-indexing." If burst is selected, the burst cam does not automatically reset to the first shot position of the three-round burst. One, two or three shots may be fired on the first pull of the trigger. Each subsequent pull of the trigger results in a complete three-round burst unless the trigger is released before the cycle is complete. If the trigger is released during the burst and the three-round cycle is interrupted, the next pull of the trigger fires the rounds remaining in the interrupted three-round cycle.

Magazine Release Button

The magazine release button releases the magazine from the magazine well. See figure 2-4.

Charging Handle

When the charging handle is pulled to the rear, the bolt unlocks from the barrel extension locking lugs and the bolt carrier group moves to the rear of the receiver. See figure 2-5.

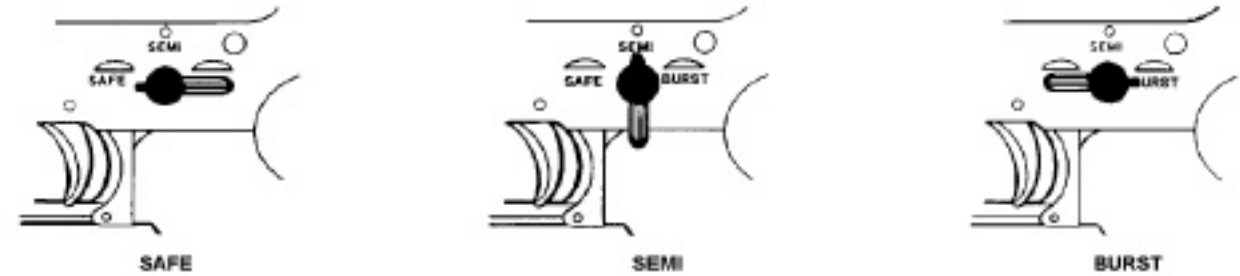


Figure 2-3. Selector Lever.

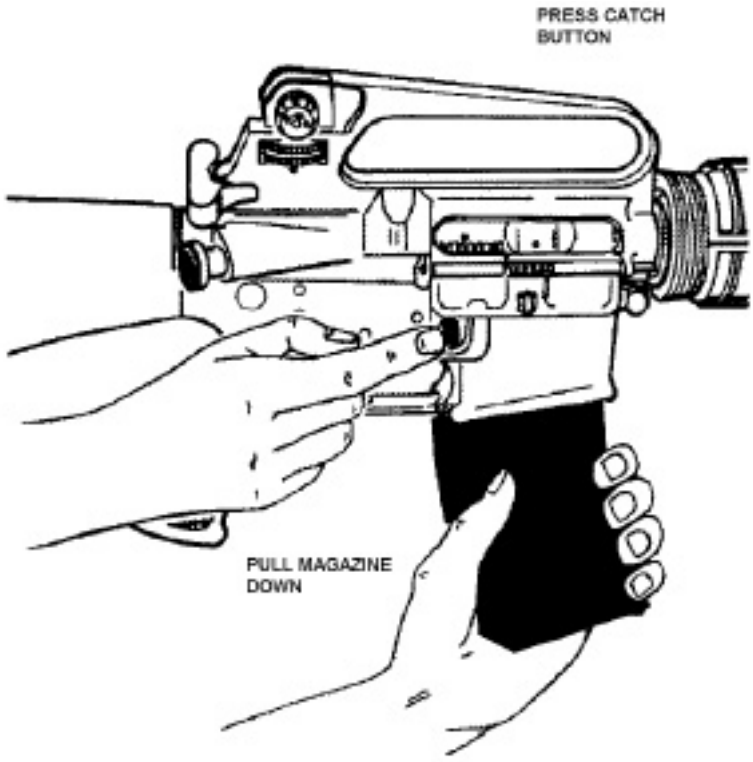


Figure 2-4. Magazine Release Button.

Bolt Catch

If the charging handle is pulled to the rear when the lower portion of the bolt catch is depressed, the bolt carrier group will lock to the rear. When the bolt carrier group is locked to the rear and the upper portion of the bolt catch is depressed, the bolt carrier group will slide forward, driven by the buffer assembly and action spring, into the firing position.

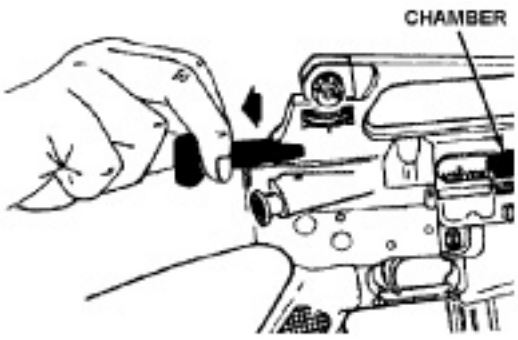


Figure 2-5. Charging Handle.

2003. CYCLE OF OPERATION

Firing

The hammer releases and strikes the head of the firing pin, driving the firing pin into the round's primer. The primer ignites the powder in the cartridge. Gas generated by the rapid burning of powder propels the projectile through the barrel. After the projectile passes the gas port, a portion of the expanding gas enters the gas port and gas tube. The gas tube directs the gas rearward into the bolt carrier key and causes the bolt carrier to move rearward. See figure 2-6 on page 2-4.

Unlocking

Figure 2-7 on page 2-4 illustrates unlocking of the bolt. As the bolt carrier moves to the rear, the bolt cam pin follows the path of the cam track located in the bolt carrier. This causes the bolt assembly to rotate until the bolt-locking lugs are no longer aligned behind the barrel extension locking lugs.

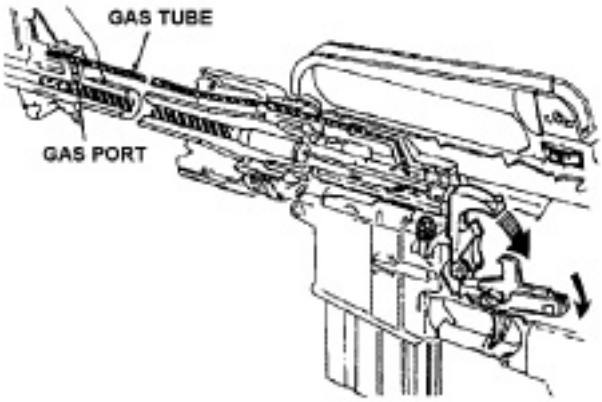


Figure 2-6. Firing.

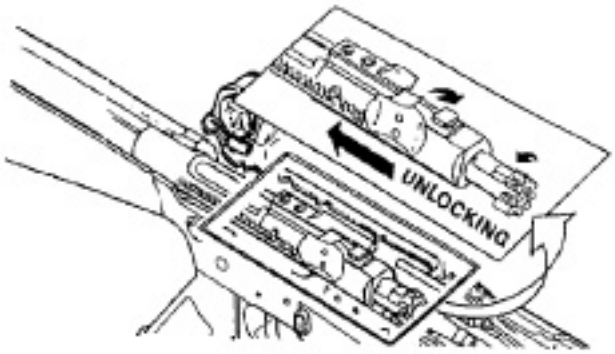


Figure 2-7. Unlocking.

Extracting

As the bolt carrier group continues to move to the rear, the extractor claw withdraws the cartridge case from the chamber. See figure 2-8.

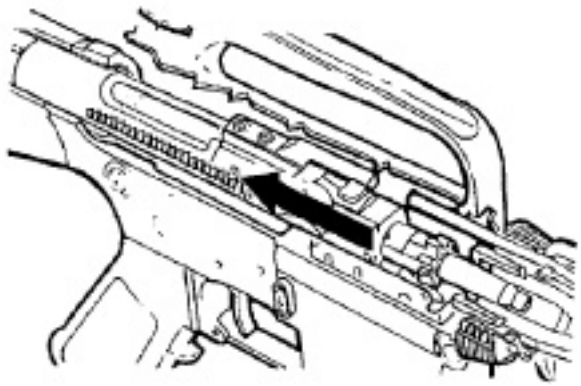


Figure 2-8. Extracting.

Ejecting

The ejector, located in the bolt face, is compressed into the bolt body by the base of the cartridge case. The rearward movement of the bolt carrier group allows the nose of the cartridge case to clear the front of the ejection port. The cartridge case is thrown out by the action of the ejector and spring. See figure 2-9.

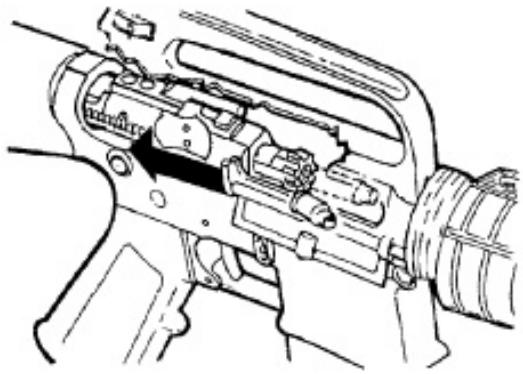


Figure 2-9. Ejecting.

Cocking

Continuing its rearward travel, the bolt carrier overrides the hammer, forces it down into the receiver, compresses the hammer spring, and causes the disconnector to engage the lower hammer hook. See figure 2-10.

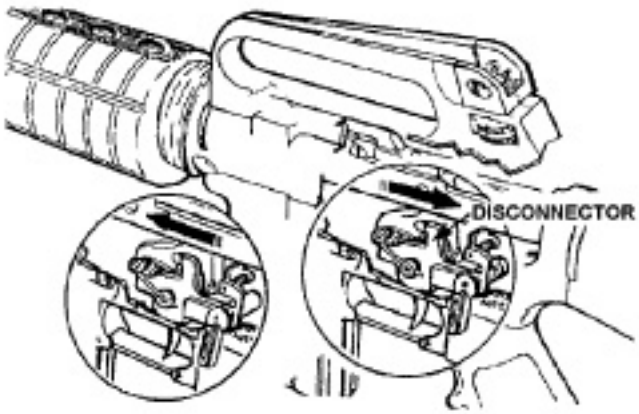


Figure 2-10. Cocking.

Feeding

Once rearward motion causes the bolt carrier group to clear the top of the magazine, the expansion of the magazine spring forces a round into the path of the bolt. After the action spring overcomes and absorbs the rearward motion of the bolt carrier group, it expands and sends the buffer assembly and bolt carrier group forward with enough force to strip a round from the magazine. See figure 2-11.

Figure 2-11. Feeding.

Chambering

As the bolt carrier group continues to move forward, pushing a fresh round in front of it, the face of the bolt thrusts the new round into the chamber. The extractor claw grips the rim of the cartridge case. The ejector is forced into its hole, compressing the ejector spring. See figure 2-12.

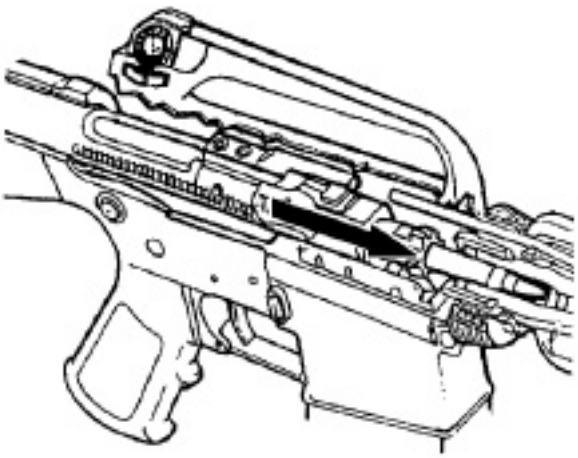


Figure 2-12. Chambering.

Locking

As the bolt carrier group continues to move forward, the bolt-locking lugs are forced against the barrel extension and the bolt cam pin is forced along the cam track. The bolt rotates and aligns the bolt locking lugs behind the barrel extension locking lugs. The weapon is ready to fire. See figure 2-13.

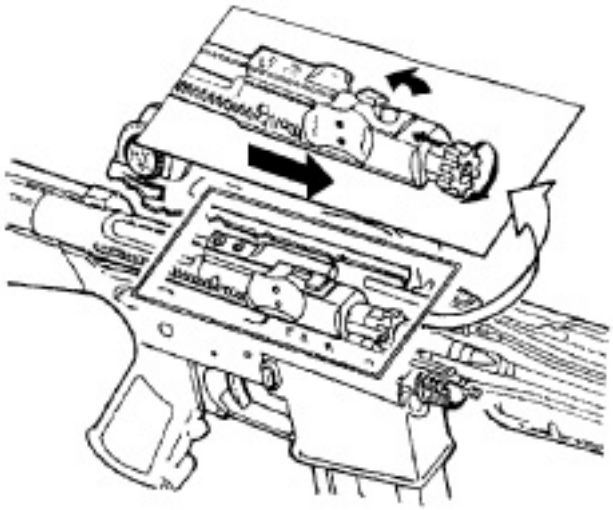


Figure 2-13. Locking.

2004. Ammunition

Four types of ammunition are authorized for use with the M16A2 service rifle: ball (M193 and M855), tracer (M196 and M856), dummy (M199), and blank (M200) (see fig. 2-14).

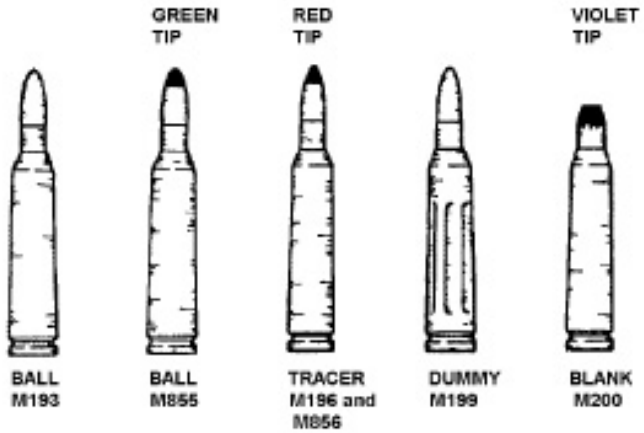


Figure 2-14. Authorized Ammunition.

M193 Ball

This ammunition is a 5.56mm centerfire cartridge with a 55-grain gilded-metal jacket, lead alloy core bullet. The primer and case are waterproofed. The M193 ball ammunition has no identifying marks.

M855 Ball

This ammunition is the primary ammunition for the M16A2 rifle. Identified by a green tip, its 5.56mm centerfire cartridge has better penetration than the M193. It has a 62-grain gilded-metal jacket bullet. The rear two-thirds of the core of the projectile is lead alloy and the front one-third is a solid steel penetrator. The primer and case are waterproofed.

M196 and M856 Tracer

This ammunition has the same basic characteristics as ball ammunition. Identified by a bright red tip, its primary uses include observation firing, incendiary effect, and signaling. Tracer ammunition should be intermixed with ball ammunition in a ratio no greater than 1:1. The preferred ratio is one tracer to four balls (1:4) to prevent metal fouling in the bore.

M199 Dummy

This ammunition has six grooves along the side of the case. It contains no propellants or primer. The primer well is open to prevent damage to the firing pin. The dummy cartridge is used during dry fire and other training purposes.

M200 Blank

This ammunition has the case mouth closed with a seven-petal rosette crimp. It contains no projectile. Blank ammunition, identified by its violet tip, is used for training purposes.

2005. Preventive Maintenance

Normal care and cleaning of the rifle will result in proper functioning of its all parts. Only issue-type cleaning materials maybe used. Improper maintenance can cause stoppages, reducing combat readiness and effectiveness.

Main Group Disassembly

The M16A2 service rifle is disassembled into three main groups (see fig. 2-15). Before disassembling the M16A2 service rifle—

Figure 2-15. Three Main Groups.

- Ensure the rifle is in Condition 4 (see para. 3002).
- Remove the sling.

Note

To facilitate control and ease of disassembly, the handguards may be removed using the "buddy system" as described in Technical Manual (TM) 05538C-10/1A, *Operator's Manual w/Components List Rifle, 5.56-mm, M16A2E W/E (1005-01-128-9936).*

Upper Receiver

To disassemble the upper receiver—

- Place the rifle on the buttstock. Press down on the slip ring with both hands. Pull the handguards free (see fig. 2-16).

  Use caution when the handguards are off the rifle. Handguards provide protection for the gas tube. Damage to the gas tube adversely affects the functioning of the rifle.

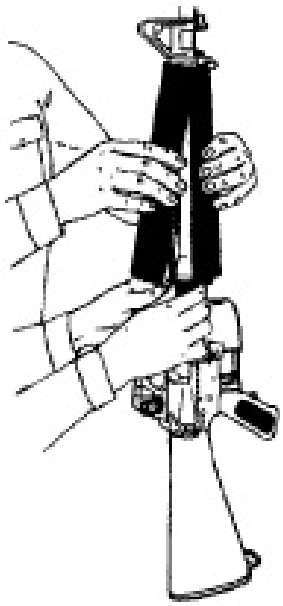


Figure 2-16. Removing the Handguards.

- Move the take down pin from the left to the right as far as it will go to allow the lower receiver to pivot down from the upper receiver.
- Move the receiver pivot pin from left to right as far as it will go and separate the upper and lower receivers.
- Pull back the charging handle and bolt carrier about 3 inches and remove the bolt carrier group.
- Remove the charging handle by sliding it back and down, out of the upper receiver.

No further disassembly is conducted on the upper receiver group.

Bolt Carrier

To disassemble the bolt carrier—

- Remove the firing pin retaining pin.
- Push the bolt back into the bolt carrier to the locked position.
- Tap the base of the bolt carrier against the palm of your hand so the firing pin will drop out.
- Rotate the bolt cam pin one-quarter turn and lift the bolt cam pin out.
- Withdraw the bolt assembly from the carrier.
- Press on the extractor's rear and use the firing pin to push out the extractor-retaining pin. Remove the extractor and spring (the spring is permanently attached to the extractor). (See fig. 2-17.)

Figure 2-17. Bolt Carrier Disassembled.

CAUTION

Be careful not to damage the tip of the firing pin while pushing out the extractor-retaining pin.

Note

The extractor assembly has a rubber insert within the spring. Do not attempt to remove it. If the spring comes loose, put the large end of the spring in the extractor and seat it. Push in the extractor pin.

Lower Receiver

To disassemble the lower receiver—

- Press in the buffer and depress the buffer retainer.

Note

It may be necessary to use the edge of the charging handle to depress the buffer retainer.

- Press the hammer downward and ease the buffer and action spring forward and out of the receiver.
- Separate the parts. See figure 2-18.

Figure 2-18. Lower Receiver Disassembled.

No further disassembly of the lower receiver is performed.

Note

In combat situations, the rifle may be partially disassembled in any sequence. However, combat situations are the exception, not the rule. Under normal operating circumstances, disassemble the rifle in the sequence just performed. Any further disassembly of the rifle is to be performed by a qualified armorer.

Magazine Disassembly

The magazine should be disassembled regularly for cleaning to avoid the possibility of malfunction or

stoppage of the rifle caused by dirty or damaged magazines. To disassemble the magazine—

- Pry up and push base plate out from the magazine.
- Jiggle the spring and follower to remove. Do not remove the follower from the spring. See figure 2-19.

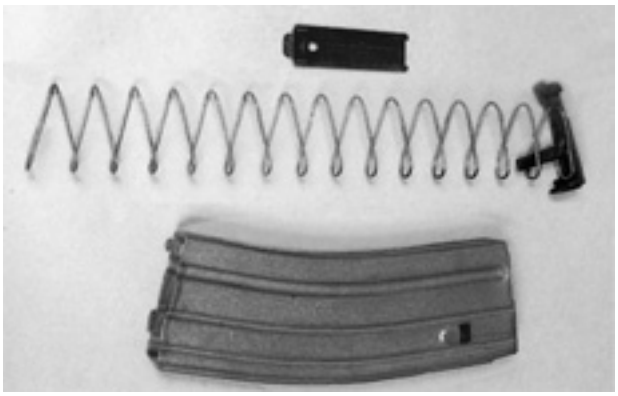


Figure 2-19. Magazine Disassembled.

Cleaning

Cleaning Materials

The following cleaning materials are used in preventive maintenance (see fig. 2-20):

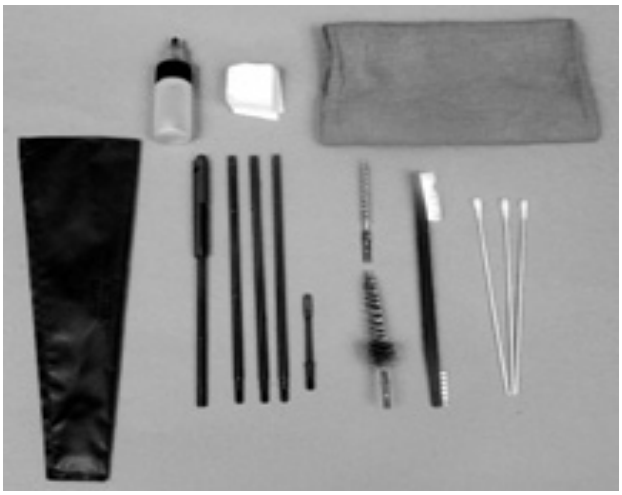


Figure 2-20. Cleaning Materials.

- Cleaner, lubricant, and preservative (CLP). Always shake the bottle well before use.
- Rod in three sections and a handle assembly.
- Patch holder section, swabs, patches, pipe cleaners, and clean rags.
- Brushes: bore, chamber, and general purpose.

Cleaning the Upper Receiver

Basic cleaning of the upper receiver group should include the following:

- Attach the three rod sections together but leave each one about two turns short of being tight.
- Attach the patch holder onto the rod.
- Point the muzzle down and insert the non-patch end of the rod into the chamber. Attach the handle to the cleaning rod section and pull a CLP-moistened 5.56mm patch through the bore.
- Attach the bore brush to the rod but leave it two turns short of being tight. Put a few drops of CLP on the bore brush. Insert the rod into the barrel from the chamber end, attach the handle, and pull the brush through the bore. Repeat 3 times. Remove bore brush and attach the patch holder to the rod with a CLP moistened patch insert the rod into the barrel from the chamber end, attach the handle, and pull the patch through the bore.
- Inspect the bore for cleanliness by holding the muzzle to your eye and looking into the bore.
- Repeat the above steps until the patches come out of the bore clean.
- Attach the chamber brush and one section of the cleaning rod to the handle. Moisten it well with CLP and insert it into the chamber.
- Scrub the chamber and bolt lugs using a combination of a plunging and clockwise rotating action.

Note

Do not reverse direction of the brush while it is in the chamber.

- Clean the interior portion of the upper receiver with the general-purpose brush and CLP.
- Dry the bore, chamber, and the interior of the receiver with rifle patches, swabs, and clean rags until they come out clean. Then moisten all interior surfaces with CLP.
- Wipe the barrel, gas tube, and handguards clean with a rag.

Cleaning the Bolt Carrier Group

- Clean the outer and inner surfaces of the bolt carrier with a general-purpose brush.
- Clean the bolt carrier key with a pipe cleaner.
- Clean the locking lugs, gas rings, and exterior of the bolt with the general-purpose brush.
- Insert a swab into the rear of the bolt and swab out the firing pin recess and gas ports.

- Clean the extractor with the general-purpose brush, ensuring all the carbon is removed from underneath the extractor lip.
- Clean extractor pin, firing pin, and firing pin retaining pin using the general-purpose brush and CLP.
- Clean charging handle assembly with the general-purpose brush and patches.

Cleaning the Lower Receiver

- Wipe dirt from the firing mechanism using a general-purpose brush, clean patch, pipe cleaners, and swabs.
- Clean the outside of the receiver with the general-purpose brush and CLP. Clean the buttplate and rear sling swivel, ensuring drain hole is clear of dirt.
- Wipe the inside of the buffer tube, buffer, and action spring.
- Wipe the inside of the magazine well with a rag.
- Wipe out the inside of the pistol grip and ensure that it is clean.

Cleaning the Magazine

- Clean the inside of the magazine with the general-purpose brush and CLP.
- Wipe dry.
- Keep the spring lightly oiled.

Inspection

While cleaning the rifle, and during each succeeding step in the preventive maintenance process, inspect each part for cracks and chips and ensure parts are not bent or badly worn. Report any damaged part to the armorer. Inspection is a critical step to ensure the combat readiness of your rifle. It is performed normally during rifle cleaning (prior to lubrication), however, it can be performed throughout the preventive maintenance process.

Lubrication

Lubrication is performed as part of the detailed procedure for preventive maintenance. Lubrication procedures are also performed in preparation for firing.

Lubricant

In all but the coldest arctic conditions, CLP is the lubricant for the rifle. Remember to remove excess CLP from the bore and chamber before firing.

- Lightly lube means that a film of CLP barely visible to the eye should be applied.
- Generously lube means the CLP should be applied heavily enough that it can be spread with the finger.

Upper Receiver

- Lightly lube the inside of the upper receiver, bore, chamber, outer surfaces of the barrel, and surfaces under the handguard.
- Depress the front sight detent and apply two or three drops of CLP to the front sight detent. Depress several times to work lubrication into the spring.
- Lubricate the moving parts and elevation screw shaft of the rear sight.

Bolt Carrier Group

- Generously lube the outside of the cam pin area, the bolt rings, and outside the bolt body.
- Lightly lube the charging handle and the inner and outer surfaces of the bolt carrier.

Lower Receiver

- Lightly lube the inside of the lower receiver extension.
- Generously lube the moving parts inside the lower receiver and their pins.

Reassembly

Reassembling the Rifle

- Return all cleaning gear into the buttstock of the rifle and close the buttplate.
- Connect the buffer and action spring and insert them into the buffer tube/stock.
- Place the extractor and spring back on the bolt. Depress the extractor to align the holes and reinsert the extractor pin.
- Insert the bolt into the carrier. Do not switch bolts between rifles.
- Hold the bolt carrier with the bolt carrier key at 12 o’clock. Insert the bolt into the bolt carrier with the extractor at 12 o’clock.

- Rotate the bolt counterclockwise until the cam pinhole aligns to the cam pin slot in the bolt carrier.

WARNING WARNING WARNING WARNING

WARNING

Ensure the cam pin is installed in the bolt group or the rifle may explode while firing.

- Insert the bolt cam pin through the bolt carrier and into the bolt. Rotate the cam pin 1/4 turn right or left. Pull the bolt forward until it stops.
- Drop in the firing pin from the rear of the bolt carrier and seat it.
- Replace the firing pin retaining pin. Ensure the head of the firing pin retaining pin is recessed inside the bolt carrier. The firing pin should not fall out when the bolt carrier group is turned upside down.
- Place the charging handle in the upper receiver by lining it up with the grooves in the receiver. Push the charging handle partially in.
- With the bolt in the unlocked position, place bolt carrier key into the groove of the charging handle.
- Push the charging handle and bolt carrier group into the upper receiver until the charging handle locks.
- Join the upper and lower receivers and engage the receiver pivot pin.
- Ensure the selector lever is on safe before closing the upper receiver. Close the upper and lower receiver groups. Push in the takedown pin.
- Install the handguards.
- Attach the sling.

Reassembling the Magazine

To reassemble the magazine—

- Insert the follower and jiggle the spring to install.
- Slide the base under all four tabs until the base catches. Make sure the printing is on the outside.

2006. Function Check

A function check is performed to ensure the rifle operates properly. To perform a function check:

- Place the weapon in Condition 4 (see para. 3002).
- Pull the charging handle to the rear and release. Ensure the selector lever is on safe and pull the trigger. The hammer should not fall.
- Place the selector lever on semi. Pull the trigger and hold it to the rear. The hammer should fall. Pull the charging handle to the rear and release. Release the trigger and pull again. The hammer should fall.
- Pull the charging handle to the rear and release. Place the selector lever on burst. Pull the trigger and hold it to the rear. The hammer should fall. Pull the charging handle to the rear three times and release. Release the trigger and pull again. The hammer should fall.
- Pull the charging handle to the rear and release. Place the selector lever on safe.

2007. User Serviceability Inspection

Individual Marines must perform user serviceability inspections on their weapons before firing them. This inspection ensures the weapon is in an acceptable operating condition.

- Place rifle in Condition 4 (see para. 3002).
- Conduct a function check.
- Check the rifle to ensure the following:
- Compensator is tight.
- Barrel is tight.
- Front sight post is straight.
- Front sight post is adjustable.
- Handguards are serviceable.
- Rear sight elevation and windage knobs are adjustable and have distinct clicks.
- Stock is tight on the lower receiver.
- Weapon is properly lubricated for operational conditions.
- Barrel is clear of obstructions.
- Gas rings are serviceable.
- Ensure magazines are serviceable.
- Load the rifle with an empty magazine. Ensure that the magazine can be seated.
- Without depressing the bolt catch, pull the charging handle to the rear. Ensure that the bolt locks to the rear.
- Depress the upper portion of the bolt catch and observe bolt moving forward on an empty chamber.

Ensure the bolt moves completely forward and locks in the chamber.

- Repeat this procedure with all magazines.

2008. Field Maintenance

Preventive maintenance in the field is performed when detailed disassembly and cleaning is not practical due to operational tempo or the level of threat. To perform limited field preventive maintenance—

- Place the rifle in Condition 4 (see paragraph 3002).
- Break the rifle down by removing the rear take down pin and rotating the upper receiver and barrel forward.
- Remove the bolt carrier group.
- Do not disassemble the bolt carrier group further.
- Clean the bolt carrier group.
- Clean the upper and lower receiver groups (without further disassembly).
- Clean the bore and chamber.
- Lubricate the rifle.
- Reassemble the rifle and perform a user serviceability inspection.

2009. Cleaning the Rifle in Various Conditions

The climatic conditions in various locations require special knowledge about cleaning and maintaining the rifle. The conditions that will affect the rifle the most are: hot, wet tropical; hot, dry desert; arctic or low temperature; and heavy rain and fording.

Hot, Wet Tropical

- Perform normal maintenance.
- Clean and lubricate your rifle more often. Inspect hidden surfaces for corrosion. Pay particular attention to spring-loaded detentes.
- Use lubricant more liberally.
- Unload and check the inside of the magazine more frequently. Wipe dry and check for corrosion.
- When practical, keep the rifle covered.

Hot, Dry Desert

Hot dry climates are usually areas that contain blowing sand and fine dust. Dust and sand will get into the rifle and magazines, causing stoppages. It is imperative to pay particular attention to the cleaning and lubrication of the rifle in this type of climate.

Corrosion is less likely to form in these environments, and lubrication will attract more dirt. For this reason, use lubrication more sparingly.

Whenever practical, keep the rifle covered.

Arctic or Low Temperature

- Clean and lubricate the rifle in a warm room, with the rifle at room temperature, if possible. Lubricating oil, arctic weapons (LAW) can be used below a temperature of 0 degrees Fahrenheit and must be used below -35 degrees Fahrenheit.
- Keep the rifle covered when moving from a warm to a cold environment to allow gradual cooling of the rifle. This prevents the condensation of moisture and freezing. Condensation will form on the rifle when it is moved from outdoors to indoors. If possible, leave the rifle in a protected but cold area outdoors. When bringing the rifle inside to a warm place, it should be disassembled and wiped down several times as it warms.
- Always try to keep the rifle dry.
- Unload and perform a function check every 30 minutes, if possible, to help prevent freezing of functional parts.
- Do not lay a warm rifle in snow or ice.
- Keep the inside of the magazine and ammunition wiped dry. Moisture will freeze and cause stoppages.

Heavy Rain and Fording

- Keep the rifle dry and covered when practical.
- Keep water out of the barrel if possible. If water does get in, drain and (if possible) dry with a patch. If water is in the barrel, point the muzzle down and break the seal by doing a chamber check so the water will drain. If water is in the stock of the weapon, ensure the drain hole in the stock is clear so the water can run out.
- Perform normal maintenance.

CHAPTER 3. WEAPONS HANDLING

Weapons handling procedures provide a consistent and standardized way for a Marine to handle, operate, and employ the rifle safely and effectively. Proper weapons handling procedures ensure the safety of Marines by eliminating negligent discharges and reinforcing positive identification of targets before engagement. Weapons handling procedures apply at all levels of training and during combat operations.

Note

+The procedures in this manual are written for right-handed Marines; left-handed Marines should reverse instructions as necessary.

3001. Safety Rules

Safe handling of the rifle is critical. If proper weapons handling procedures are not used, a Marine risks his safety and the safety of his fellow Marines. During combat, a Marine must react quickly, safely, and be mentally prepared to engage targets. To ensure that only the intended target is engaged, a Marine must apply the following safety rules at all times:

Rule 1—Treat every weapon as if it were loaded. When a Marine takes charge of a rifle in any situation, he must treat the weapon as if it were loaded, determine its condition (see para. 3003), and continue applying the other safety rules.

Rule 2—Never point a weapon at anything you do not intend to shoot. A Marine must maintain muzzle awareness at all times.

Rule 3—Keep your finger straight and off the trigger until you are ready to fire. A target must be identified before taking the weapon off safe and moving the finger to the trigger.

Rule 4—Keep the weapon on safe until you intend to fire. A target must be identified before taking the weapon off safe. This rule is intended to eliminate the chance of the weapon discharging by accident (e.g., brush snagging the trigger).

3002. Weapons Conditions

A weapon's readiness is described by one of four conditions. The steps in the loading and unloading process take the rifle through four specific conditions of readiness for live fire.

Condition 1. Safety on, magazine inserted, round in chamber, bolt forward, ejection port cover closed.

Condition 2. Not applicable to the M16A2 rifle.

Condition 3. Safety on, magazine inserted, chamber empty, bolt forward, ejection port cover closed.

Condition 4. Safety on, magazine removed, chamber empty, bolt forward, ejection port cover closed.

3003. Determining a Weapon's Condition (Chamber Check)

A Marine must know the condition of his weapon at all times. When a Marine takes charge of a weapon in any situation, he must determine its condition. Situations include coming across an unmanned rifle in combat, taking charge of any weapon after it has been unmanned (e.g., out of a rifle rack, stored in a vehicle), or taking charge of another Marine's weapon. To determine the condition of the weapon in any of these situations, the Marine should:

- Determine if a magazine is present.
- Ensure the rifle is on safe.

- Conduct a chamber check.
- Bring the left hand back against the magazine well.
- Extend the fingers of the left hand and cover the ejection port (see fig. 3-1).

Figure 3-1. Position of Hand.

- Grasp the charging handle with the index and middle fingers of the right hand.
- Pull the charging handle slightly to the rear and visually and physically inspect the chamber (see fig. 3-2). *Right-handed Marines*, insert one finger of the left hand into the ejection port and feel whether a round is present. *Left-handed Marines*, insert the thumb of the right hand into the ejection port and feel whether a round is present.

Figure 3-2. Chamber Check.

Note

The same procedure is used in daylight as during low visibility. A chamber check may be conducted at any time.

CAUTION

Pulling the charging handle too far to the rear while inspecting the chamber may cause double feed or ejection of one round of ammunition.

- Release the charging handle and observe the bolt going forward.
- Tap the forward assist.
- Close the ejection port cover (if time and the situation permit).
- Remove the magazine (if present) and observe if ammunition is present. If time permits, count the rounds. Reinsert the magazine into magazine well.

3004. Weapons Commands

Weapons commands dictate the specific steps required to load and unload the rifle. Six commands are used in weapons handling:

Load. This command is used to take the weapon from Condition 4 to Condition 3.

Make Ready. This command is used to take the weapon from Condition 3 to Condition 1.

Fire. This command is used to specify when a Marine may engage targets.

Cease-Fire. This command is used to specify when a Marine must stop target engagement.

Unload. This command is used to take the weapon from any condition to Condition 4.

Unload and Show Clear. This command is used when an observer must check the weapon to verify that no ammunition is present before the rifle is placed in Condition 4.

Loading the Rifle

Perform the following steps to load the rifle (take the rifle to Condition 3):

- Ensure the rifle is on safe.
- Withdraw the magazine from the magazine pouch.
- Observe the magazine to ensure it is filled.
- Fully insert the magazine in the magazine well. Without releasing the magazine, tug downward on the magazine to ensure it is seated.
- Close the ejection port cover.
- Fasten the magazine pouch.

Making the Rifle Ready

Perform the following steps to make the rifle ready for firing (take the rifle to Condition 1):

- Pull the charging handle to the rear and release. There are two methods of doing this:
- Grip the pistol grip firmly with the right hand and pull the charging handle with the left hand to its rearmost position and release (see fig. 3-3).

  Or grip the handguards firmly with the left hand and pull the charging handle with the right hand to its rearmost position and release (see fig. 3-4).

Figure 3-3. Pulling the Charging Handle with the Left Hand.

Figure 3-4. Pulling the Charging Handle with the Right Hand.

- To ensure ammunition has been chambered, conduct a chamber check (see para. 3003) to ensure a round has been chambered.
- Check the sights (to ensure proper battlesight zero [BZO] setting, correct rear sight aperture, etc.).
- Close ejection port cover.

Fire

On the command “Fire,” aim the rifle, take the rifle off safe, and pull the trigger.

Cease-Fire

On the command “Cease Fire,” perform the following steps:

- Place your trigger finger straight along the receiver.
- Place the weapon on safe.

Unloading the Rifle

Perform the following steps to unload the rifle (take the rifle to Condition 4):

- Ensure the weapon is on safe.
- Remove the magazine from the rifle and retain it on your person.

- Cup the left hand under the ejection port, rotate the weapon until the ejection port faces down.
- Pull the charging handle to the rear and catch the round in the left hand (see fig. 3-5).

Figure 3-5. Catching the Round.

- Lock the bolt to the rear.
- Put the weapon on safe if the selector lever would not move to safe earlier.
- Ensure the chamber is empty and that no ammunition is present.
- Depress the bolt catch and observe the bolt moving forward on an empty chamber (see fig. 3-6).

Figure 3-6. Observing the Chamber.

- Close the ejection port cover.
- Check the sights (for proper BZO setting, correct rear sight aperture, etc.).
- Place any ejected round into the magazine and return the magazine to the magazine pouch and close the magazine pouch.

Unloading and Showing the Rifle Clear

Perform the following steps to unload the rifle and show it clear to an observer (take the rifle to Condition 4). The Marine—

- Ensures the weapon is on safe.
- Removes the magazine from the rifle and retains it.
- Cups the left hand under the ejection port, rotates the weapon until the ejection port faces down.
- Pulls the charging handle to the rear and catches the round in the left hand.
- Locks the bolt to the rear and ensures the chamber is empty and that no ammunition is present.
- Has another Marine inspect the weapon to ensure no ammunition is present (see fig. 3-7).

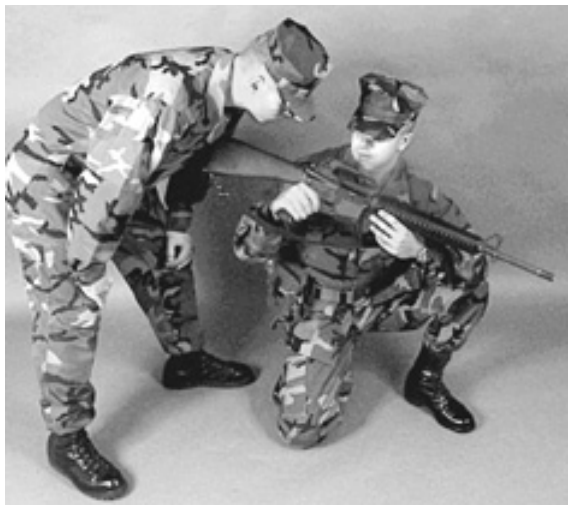


Figure 3-7. Observer Inspection.

The observer—

- Visually inspects the chamber to ensure it is empty, no ammunition is present, and the magazine is removed.
- Ensures the weapon is on safe.
- Acknowledges the rifle is clear.

The Marine, after receiving acknowledgment that the rifle is clear—

- Depresses the bolt catch and observes the bolt moving forward on an empty chamber.
- Closes the ejection port cover.
- Checks the sights (for proper BZO setting, correct rear sight aperture, etc.).
- Places any ejected round into the magazine and returns the magazine to the magazine pouch and closes the magazine pouch.

3005. Filling, Stowing, and Withdrawing Magazines

Filling the Magazine with Loose Rounds

Perform the following steps to fill the magazine:

- Remove a magazine from the magazine pouch.
- Place a round on top of the follower.
- Press down until the round is held between the follower and magazine feed lips (see fig. 3-8).

Figure 3-8. Filling the Magazine.

- Repeat until the desired number of rounds is inserted. The recommended number of rounds per magazine is 28 or 29. Thirty rounds in the magazine may prohibit the magazine from seating properly on a closed bolt.
- Tap the back of the magazine to ensure the rounds are seated against the back of the magazine.

Filling the Magazine Using a 10-round Stripper Clip and Magazine Filler

The magazine can also be filled quickly using a 10-round stripper clip and the magazine filler (see fig. 3-9).

Figure 3-9. Magazine Filler and 10-round

Perform the following steps to fill the magazine with the 10-round stripper clip (see fig. 3-10):

Figure 3-10. Filling the Magazine with a Stripper Clip and Magazine Filler.

- Remove a magazine from the magazine pouch.
- Slide the magazine filler into place.
- Place a 10-round stripper clip into the narrow portion of the magazine filler.
- Using thumb pressure on the rear of the top cartridge, press down firmly until all ten rounds are below the feed lips of the magazine.
- Remove the empty stripper clip while holding the magazine filler in place.
- Repeat until the desired number of rounds is inserted. The recommended number of rounds per magazine is 28 or 29. Thirty rounds in the magazine may prohibit the magazine from seating properly on a closed bolt.
- Remove magazine filler and retain it for future use.
- Tap the back of the magazine to ensure the rounds are seated against the back of the magazine.

Stowing Magazines

Magazine Pouch

In a magazine pouch, filled magazines are stored with rounds down and projectiles pointing away from the body.

Load-bearing Vest

In a load-bearing vest, filled magazines are stored with rounds down and projectiles pointing outboard.

Empty or Partially Filled Magazines

Empty or partially filled magazines are stored with the follower up to allow the selection of filled magazines by touch (i.e., at night).

Withdrawing Magazines

Magazine Pouch

With the right hand, withdraw magazines from the magazine pouch on the right side of the body. With the left hand, withdraw magazines from the magazine pouch on the left side of the body. To withdraw magazines from a magazine pouch—

- Use the thumb and index finger, pinch the magazine pouch release to open the magazine pouch.
- Slide the thumb over the magazines, feeling for a base plate indicating a filled magazine. Continue sliding the thumb until it rests on the back of the magazine.
- Grasp the magazine with the thumb, index finger, and middle finger and lift the magazine directly out of the pouch.
- Once the magazine is clear of the pouch, curl the ring finger and little finger underneath the magazine and rotate it up to observe rounds in the magazine.

Load-bearing Vest

With the right hand, withdraw magazines from the left side of the vest (see fig. 3-11). With the left hand, withdraw magazines from the right side of the vest (see fig. 3-12).

To withdraw magazines from a load-bearing vest:

- With the thumb and index finger, unfasten the snap on the vest pouch.
- Slide the thumb over the magazine, feeling for a base plate indicating a filled magazine.
- Rotate the hand over the magazine while sliding the thumb to the back of the magazine.
- Grasp the magazine with the thumb, index finger, and middle finger, while curling the ring finger and little finger on top of the base plate.
- Lift the magazine directly out of the pouch and rotate it up to observe the rounds in the magazine.

Figure 3-11. Withdrawing a Magazine with the Right Hand.

3006. Reloading the Rifle

Principles of Reloading

The first priority when performing a reload is to get the rifle reloaded and back into action. The second priority when performing a reload is to retain the magazine so when you move, the magazine moves with you. When time permits, retain magazines securely on your person (e.g., in magazine pouch, flak jacket, and cargo pocket). The combat situation may dictate dropping the magazine to the deck when performing a reload. This is acceptable as long as it is picked up before moving to another location.

Take cover before reloading. Always reload before leaving cover to take advantage of the protection provided by cover.

When moving, your focus should be on moving, therefore every effort should be made to not reload while on the move.

When reloading, your focus is on the magazine change.

When reloading, draw the weapon in close to your body so you can see what you are doing and retain positive control of the magazine.

When the new magazine is inserted, tug on it to ensure it is seated. Do not slam the magazine into the weapon hard enough to cause a round to partially pop out of the magazine. This action will cause a double feed and require remedial action.

Figure 3-12. Withdrawing a Magazine

Retain your empty magazines. When there is a lull in the action, refill those magazines so they will be available for future use.

During a lull in the action, replace your magazine when you know you are low on ammunition. This ensures a full magazine of ammunition in the rifle should action resume. Do not wait until the magazine is completely empty to replace it.

Condition 1 Reload

A condition 1 reload is performed when the weapon is in condition 1 by replacing the magazine before it runs out of ammunition. To perform a condition 1 reload, perform the following steps:

- Withdraw a filled magazine from the magazine pouch. With the same hand, press the magazine button and remove the partially filled magazine so it can be retained in the remaining fingers.
- Fully insert the filled magazine into the magazine well and tug downward on the magazine to ensure it is properly seated.
- Store the partially filled magazine in the magazine pouch with rounds up and projectiles pointing away from the body.
- Fasten the magazine pouch.

Dry Reload

A dry reload is required when the magazine in the weapon has been emptied and the bolt has locked to the rear. To perform a dry reload—

- Press the magazine release button.
- Remove the empty magazine and retain it on your person when time permits.
- Fully insert a filled magazine into the magazine well and tug downward on the magazine to ensure it is properly seated.
- Depress the bolt catch to allow the bolt carrier to move forward and observe the round being chambered. This places the rifle in Condition 1.

3007. Remedial Action

If the rifle fails to fire, a Marine performs remedial action. Remedial action is the process of investigating the cause of the stoppage, clearing the stoppage, and returning the weapon to operation.

Observe for Indicators

Once the rifle ceases firing, the Marine must visually or physically observe the ejection port to identify the problem before he can clear it. The steps taken to clear the weapon are based on observation of one of the following three indicators:

Indicator: The bolt is forward or the ejection port cover is closed. See figures 3-13 and 3-14.

Figure 3-13. Bolt Forward.

Figure 3-14. Ejection Port Cover Closed.

To return the weapon to operation—

- Seek cover if the tactical situation permits.
- Tap—Tap the bottom of the magazine.
- Rack—Pull the charging handle to the rear and release it.
- Bang—Sight in and attempt to fire.

Indicator: Brass is obstructing chamber area (usually indicating a double feed or failure to eject). See figure 3-15.

Figure 3-15. Brass Obstructing the Chamber.

To return the weapon to operation—

- Seek cover if the tactical situation permits.
- Attempt to remove the magazine.
- Attempt to lock the bolt to the rear

If the bolt will not lock to the rear, rotate the rifle so the ejection port is facing down; hold the charging handle to the rear as far as it will go and shake the rifle to free the round(s). If the rounds do not shake free, hold the charging handle to the rear and strike the butt of the rifle on the ground or manually clear the round. Conduct a reload. Sight in and attempt to fire.

Indicator: The bolt is locked to the rear. See figure 3-16. To clear return the weapon to operation—

Figure 3-16. Bolt Locked to the Rear.

Note

Although a dry weapon is not considered a true stoppage or mechanical failure, the Marine must take action to return the weapon to operation.

- Seek cover if the tactical situation permits.
- Conduct a dry reload.
- Sight in and attempt to fire.

Audible Pop or Reduced Recoil

An audible pop occurs when only a portion of the propellant is ignited. It is normally identifiable by reduced recoil and is sometimes accompanied by excessive smoke escaping from the chamber area. To clear the rifle in a combat environment:

- Place the rifle in Condition 4.
- Move take down pin from left to right as far as it will go to allow the lower receiver to pivot.
- Remove the bolt carrier group.
- Inspect the bore for an obstruction from the chamber end.
- Insert a cleaning rod into the bore from the muzzle end and clear the obstruction.
- Reassemble the rifle.
- Conduct a reload.
- Sight in and attempt to fire.

3008. Weapons Carries

Weapons carries provide an effective way to handle the rifle while remaining alert to enemy engagement. Weapons carries are tied to threat conditions and are assumed in response to a specific threat situation. The weapons carry assumed prepares the Marine, both mentally and physically, for target engagement. The sling provides additional support for the weapon when firing; therefore, the hasty sling should be used in conjunction with the carries.

Tactical Carry

A Marine carries the rifle at the tactical carry if no immediate threat is present. The tactical carry permits control of the rifle while a Marine is moving, yet it still allows quick engagement of the enemy. A Marine performs the following steps to assume the tactical carry:

- Place left hand on the handguards, right hand around the pistol grip, trigger finger straight along the receiver (see fig. 3-17), and right thumb on top of the selector lever (see fig. 3-18).

Figure 3-17. Straight Trigger Finger.

Figure 3-18. Thumb on Selector Lever.

- Place the buttstock along the side of the body at approximately hip level.
- Angle the muzzle upward about 45 degrees in a safe direction.
- Position the muzzle in front of the eyes, slightly below eye level (see fig. 3-19).
- Move the head and the eyes with the muzzle as it moves.

Figure 3-19. Tactical Carry.

Alert Carry

A Marine carries the rifle at the alert if enemy contact is likely. The alert is also used for moving in close terrain (e.g., urban, jungle). A Marine can engage the enemy faster from the alert than from the tactical carry. However, the alert is more tiring than the tactical carry and its use can be physically demanding. A Marine performs the following steps to assume the alert:

- Place the left hand on the handguards, the right hand around the pistol grip, the trigger finger straight along the receiver (see fig. 3-17), and the right thumb on top of the selector lever (see fig. 3-18).
- Place the buttstock in the shoulder.
- Angle the muzzle downward about 45 degrees and point it in a safe direction or the general direction of likely enemy contact (see fig. 3-20).

Figure 3-20. Alert Carry.

Ready Carry

A Marine carries the rifle at the ready if contact with the enemy is imminent. The ready allows immediate target engagement, but it is very tiring to maintain over a long period of time. A Marine performs the following steps to assume the ready:

- Place left hand on handguards, right hand around the pistol grip, the trigger finger straight along the receiver (see fig. 3-17), and the right thumb on top of the selector lever (see fig. 3-18).
- Place the buttstock in the shoulder.
- Point the muzzle in the direction of the enemy.

- Lower the sights to just below eye level so that a clear field of view is maintained so that a target may be identified (see fig. 3-21).

Figure 3-21. Ready Carry.

3009. Weapons Transports

Weapons transports are used to carry the rifle over the back or shoulders when moving for long periods; they provide a more relaxed position for walking. Weapons transports are used if no immediate threat is present. They are also used whenever one or both hands are needed for other work.

Strong Side Sling Arms Transport (Muzzle Up)

To assume the strong side sling arms (muzzle up) transport from the tactical carry, a Marine performs the following steps (see fig. 3-22):

- Release the hold on the pistol grip.
- Lower the buttstock and bring the rifle to a vertical position.
- With the right hand, grasp the sling above the left forearm.

Figure 3-22. Strong Side Sling Arms Transport (Muzzle Up).

- With the left hand, guide the rifle around the right shoulder.
- With the right hand, apply downward pressure on the sling. This stabilizes the rifle on the shoulder.

Weak Side Sling Arms Transport (Muzzle Down)

The weak side sling arms (muzzle down) transport can be used in inclement weather to keep moisture out of the rifle's bore. To assume this transport from the tactical carry, a Marine performs the following steps (see fig. 3-23):

- Release the hold on the pistol grip.
- With the left hand, rotate muzzle down and bring the rifle to a vertical position on the left side of the body. The pistol grip is pointed outboard.
- With right hand, place sling on left shoulder.
- Grasp sling above the waist with the left hand.
- With the left hand, apply downward pressure on the sling. This stabilizes the rifle on the shoulder.

Figure 3-23. Weak Side Sling Arms Transport (Muzzle Down.)

Cross Body Sling Arms Transport

A Marine uses the cross body sling arms transport if he requires both hands for work. The rifle is slung across the back with the muzzle up or down. Normally, the rifle is carried with the muzzle down to prevent pointing the muzzle in an unsafe direction.

To assume a cross body sling transport, a Marine performs the following steps from weak side sling arms (muzzle down) (see fig. 3-24):

Figure 3-24. Cross Body Sling Arms Transport (Muzzle Down).

- With the right hand, grasp the sling.
- With the left hand, grasp the handguards.
- Pull up on the rifle with both hands.
- Slide the sling over the head.
- Position the rifle so that it rests comfortably across the back.

To assume a cross body sling transport, a Marine performs the following steps from strong side sling arms (muzzle up) (see fig. 3-25):

- With the left hand, grasp the sling.
- With the right hand, grasp the pistol grip.
- Pull up on the rifle with both hands.
- Slide sling over head.
- Position the rifle so that it rests comfortably across the back.

Figure 3-25. Cross Body Sling Arms. Transport (Muzzle Up).

Note

Ensure the muzzle of the rifle is maintained in a safe direction when assuming this transport.

3010. Transferring the Rifle

Proper weapons handling is required every time a Marine picks up a weapon, passes a weapon to another Marine, or receives a weapon from another Marine. It is the responsibility of the Marine receiving or taking charge of a weapon to determine its condition. Depending on the situation, there are two procedures that can be used to transfer a rifle from one Marine to another Marine: show clear transfer and condition unknown transfer.

Show Clear Transfer

When time and the tactical situation permit, the Marine should transfer the rifle using the show clear transfer. To properly pass a rifle between Marines, the Marine handing off the rifle must perform the following procedures:

- Ensure the rifle is on safe.
- Remove the magazine if it is present.
- Lock the bolt to the rear.
- Visually inspect the chamber to ensure there is no ammunition present.
- Leave the bolt locked to the rear and hand the weapon to the other Marine.

The Marine receiving the weapon must:

- Ensure the rifle is on safe.
- Visually inspect the chamber to ensure there is no ammunition present.
- Release the bolt catch and observe the bolt going forward on an empty chamber.
- Close the ejection port cover.

Condition Unknown Transfer

There are times when time or the tactical situation does not permit a show clear transfer of the rifle. The procedures for the condition unknown transfer are conducted by a Marine when he takes charge of a rifle in any situation when the condition of the rifle is unknown (e.g., an unmanned rifle from a casualty, a rifle stored in a rifle rack). To properly take charge of a rifle when its condition is unknown, the Marine must perform the following procedures:

- Ensure the rifle is on safe.
- Conduct a chamber check to determine the condition of the weapon (see para. 3003).
- Remove the magazine and observe if ammunition is present. If time permits, count the rounds.
- Insert the magazine into the magazine well.
- Close the ejection port cover.

3011. Clearing Barrel Procedures

Purpose of a Clearing Barrel

The sole purpose of a clearing barrel is to provide a safe direction in which to point a weapon when loading; unloading; and unloading and showing clear. See figure 3-26 on page 3-12. Clearing barrel procedures are identical to the weapons handling

procedures for the rifle for the loading; unloading; and unloading and showing clear.

Figure 3-26. Clearing Barrel.

Procedures for "Load"

On the command "Load," the Marine will perform the following steps to take the rifle from Condition 4 to Condition 3:

- With a straight trigger finger, point the rifle in the clearing barrel.
- Ensure the rifle is on safe.
- Withdraw a magazine from the magazine pouch.
- Observe the magazine to ensure it is filled.
- Fully insert the magazine into the magazine well.
- Without releasing the magazine, tug downward on the magazine to ensure it is seated.
- Fasten the magazine pouch.
- Close the ejection port cover.

Procedures for "Make Ready"

If standard operating procedures (SOP) or rules of engagement (ROE) require the rifle to be carried in Condition 1, the Marine will "Make Ready" at the clearing barrel. On the command "Make Ready," the Marine will perform the following steps to take the rifle from Condition 3 to Condition 1:

- Pull the charging handle to the rear and release. There are two methods of doing this:
  - Grip the pistol grip firmly with the right hand and pull the charging handle with the left hand to its rearmost position and release.
  - Or grip the handguards firmly with the left hand and pull the charging handle with the right hand to its rearmost position and release.
- To ensure ammunition has been chambered, conduct a chamber check.
- Check the sights (to ensure proper BZO setting, correct rear sight aperture, etc.).
- Close the ejection port cover.

Procedures for "Unload"

On the command "Unload," the Marine will perform the following steps to take the rifle from any condition to Condition 4:

- With a straight trigger finger, point the rifle in the clearing barrel.
- Ensure the weapon is on safe.
- Remove the magazine from the rifle and retain it on your person.
- While cupping the left hand under the ejection port, rotate weapon until the ejection port is facing down.
- Pull the charging handle to the rear and catch the round in the left hand (see fig. 3-17).
- Lock the bolt to the rear.
- Put weapon on safe if not already on safe.
- Ensure that the chamber is empty and that no ammunition is present.
- Release the charging handle and observe the bolt moving forward on an empty chamber.
- Close the ejection port cover.
- Check the sights (for proper BZO setting, correct rear sight aperture, etc.).
- Place any ejected round into the magazine and return the magazine to the magazine pouch and close the magazine pouch.

Procedures for "Unload and Show Clear"

On the command "Unload and Show Clear," the Marine will perform the following steps to take the rifle from any condition to Condition 4:

- With a straight trigger finger, point the rifle in the clearing barrel.
- Ensure the weapon is on safe.
- Remove the magazine from the rifle and retain it on your person.
- While cupping the left hand under the ejection port, rotate the weapon until the ejection port is facing down.
- Pull the charging handle to the rear and catch the round in the left hand.
- Lock the bolt to the rear.

- Ensure the chamber is empty and no ammunition is present.
- Have an observer inspect the weapon to ensure no ammunition is present. The observer:
  - Visually inspects chamber to ensure it is empty, no ammunition is present, and the magazine is removed.
  - Ensures the weapon is on safe.
  - Acknowledges the rifle is clear.
- After receiving acknowledgment from the observer that the rifle is clear, the Marine releases the bolt catch and observes the bolt moving forward on an empty chamber.
- Close the ejection port cover.
- Check the sights (for proper BZO setting, correct rear sight aperture, etc.).
- Place any ejected round into the magazine and return the magazine to the magazine pouch and close the magazine pouch.

CHAPTER 4. FUNDAMENTALS OF MARKSMANSHIP

The fundamentals of marksmanship are aiming, breathing, and trigger control. These techniques provide the foundation for all marksmanship principles and skills. For rifle fire to be effective, it must be accurate. A rifleman who merely sprays shots in the vicinity of the enemy produces little effect. The fundamentals of marksmanship, when applied correctly, form the basis for delivering accurate fire on enemy targets. These skills must be developed so that they are applied instinctively. During combat, the fundamentals of marksmanship must be applied in a time frame consistent with the size and the distance of the target. At longer ranges, the target appears to be smaller and a more precise shot is required to accurately engage the target. The fundamentals are more critical to accurate engagement as the range to the target increases. To be accurate at longer ranges, the Marine must take the time to slow down and accurately apply the fundamentals. At shorter ranges, the enemy must be engaged quickly before he engages the Marine. As the size of the target increases, and the distance to the target decreases, the fundamentals, while still necessary, become less critical to accuracy.

Note

+ The procedures in this manual are written for right-handed Marines; left-handed Marines should reverse instructions as necessary.

4001. Aiming

Sight Alignment

Sight alignment is the relationship between the front sight post and rear sight aperture and the aiming eye. This relationship is the most critical to aiming and must remain consistent from shot to shot. To achieve correct sight alignment (see fig. 4-1):

- Center the tip of the front sight post vertically and horizontally in the rear sight aperture.
- Imagine a horizontal line drawn through the center of the rear sight aperture. The top of the front sight post will appear to touch this line.
- Imagine a vertical line drawn through the center of the rear sight aperture. The line will appear to bisect the front sight post.

Sight Picture

Sight picture is the placement of the tip of the front sight post in relation to the target while maintaining sight alignment. Correct sight alignment but improper sight placement on the target will cause the bullet to impact the target incorrectly on the spot where the sights were aimed when the bullet exited the muzzle.

To achieve correct sight picture, place the tip of the front sight post at the center of the target while maintaining sight alignment (see fig. 4-2). Center mass is

Figure 4-1. Correct Sight Alignment.

Figure 4-2. Correct Sight Picture.

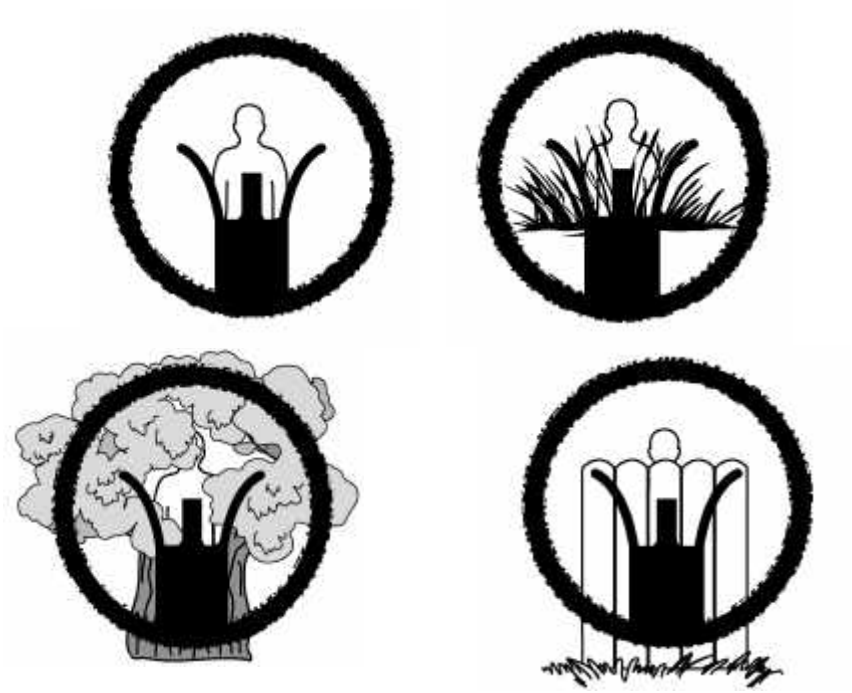


Figure 4-3. Examples of Correct Sight Picture.

the correct aiming point so that point of aim/point of impact is achieved.

The sighting system for the M16A2 rifle is designed to work using a center mass sight picture.

In combat, targets are often indistinct and oddly shaped. The center mass hold provides a consistent aiming point (see fig. 4-3).

Importance of Correct Sight Alignment

A sight alignment error results in a misplaced shot. The error grows proportionately greater as the distance to the target increases. An error in sight picture, however, remains constant regardless of the distance to the target. See figure 4-4.

Factors Affecting Sight Alignment and Sight Picture

Stock Weld

Stock weld is the point of firm contact between the cheek and the stock of the rifle. See figure 4-5.

The head should be as erect as possible to enable the aiming eye to look straight through the rear sight aperture. If the position of the Marine's head causes him to look across the bridge of his nose or out from under his eyebrow, the eye will be strained. The eye functions best in its natural forward position. Changing the placement of the cheek up or down on the stock from shot to shot may affect the zero on the rifle due to the perception of the rear sight aperture. A consistent and proper stock weld is critical to the aiming process because it provides consistency in eye relief, which affects the ability to align the sights.

Eye Relief

Eye relief is the distance between the rear sight aperture and the aiming eye. See figure 4-6. Normal eye relief is two to six inches from the rear sight aperture. The distance between the aiming eye and the rear sight aperture depends on the size of the Marine and the firing position. While eye relief varies slightly from one position to another, it is important to have the same eye relief for all shots fired from a particular position.

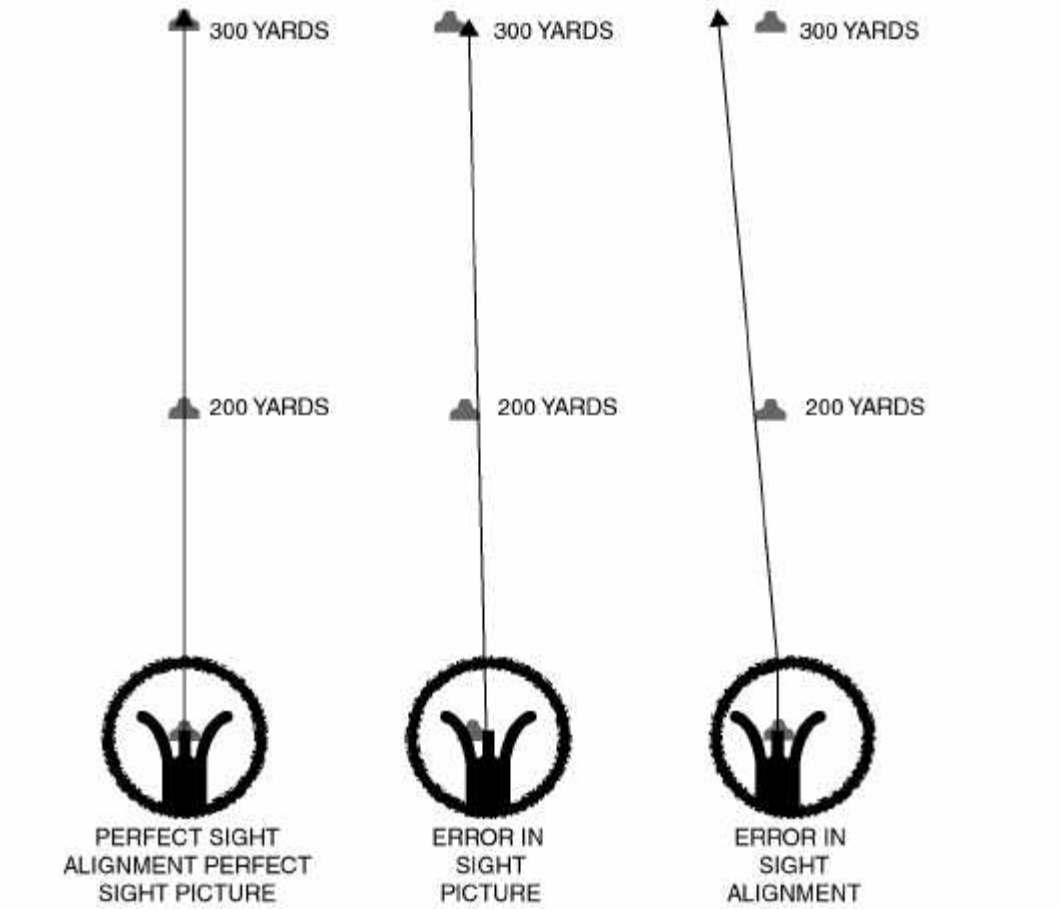


Figure 4-4. Importance of Correct Sight Alignment.

Figure 4-5. Stock Weld.

Figure 4-6. Proper Eye Relief.

If the eye is too close to the rear sight aperture, it will be difficult to line up the front sight post in the rear sight aperture (see fig. 4-7). Moving the eye back from the rear sight aperture will make the aperture appear smaller and allow the tip of the front sight post to be easily lined up inside the rear sight aperture.

Figure 4-7. Shortened Eye Relief.

If the eye is too far from the rear sight aperture, it will be difficult to acquire the target and to maintain a precise aiming point (see fig. 4-8).

Wearing of Glasses

Wearing glasses can alter the perception of sight alignment and sight picture. If wearing glasses, it is critical to look through the optic center of the lens.

Acquiring and Maintaining Sight Alignment and Sight Picture

The human eye can focus clearly on only one object at a time. For accurate shooting, it is important to focus on the tip of the front sight post. When the shot is fired, focus must be on the tip of the front sight post; peripheral vision will include the rear sight and the target. The rear sight and the target will appear blurry. Staring or fixing the vision on the front sight post for longer than a few seconds can distort the image, making it difficult to detect minute errors in sight alignment.

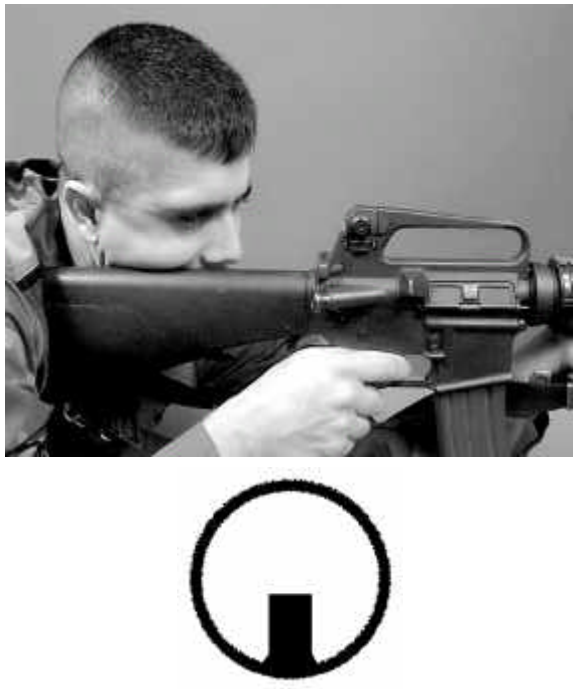


Figure 4-8. Extended Eye Relief.

Proper stock weld and placement of the rifle butt in the shoulder aid in establishing sight alignment quickly. The rifle butt's placement in the shoulder serves as the pivot point for presenting the rifle up to a fixed point on the cheek (stock weld). During combat, a Marine will look at the target as the rifle is presented. As rifle sights become level with the aiming eye, a Marine visually locates the target through the rear sight aperture. As the rifle settles, a Marine's focus shifts back to the front sight post to place the tip of the post on the target and obtain sight alignment and sight picture. To maintain sight alignment and sight picture, the Marine's focus should shift repeatedly from the front sight post to the target until correct sight alignment and sight picture are obtained. This enables the detection of minute errors in sight alignment and sight picture.

Size and Distance to the Target

During combat, the fundamentals of marksmanship must be applied in a time frame consistent with the size and the distance to the target.

Long-range Engagements

At longer ranges, the target appears smaller and a more precise shot is required to accurately engage the target. Sight alignment and sight picture are more crit-

ical to accurate engagement as the range to the target increases. To be accurate at longer ranges, the Marine must take the time to slow down and accurately apply the fundamentals.

As the distance to the target increases, the front sight post covers more of the target, making it difficult to establish a center of mass hold (see fig. 4-9). Since the Marine must see the target to engage it, there is a tendency to look at the target by lowering the tip of the front sight post. This causes shots to impact low or miss the target completely. A Marine must consciously aim at the center of mass and attempt to maintain a center mass sight picture.

Short-range Engagements

At shorter ranges, the enemy must be engaged quickly before he engages the Marine. As distance to the target decreases, the size of the target appears to increase, and sight alignment becomes less critical to accuracy. At very short ranges, a deviation in sight alignment can still produce accurate results as long as the tip of the front sight post is in the rear sight aperture and on the target (see fig. 4-10). The time required to engage a target is unique to each individual. Although a Marine must engage the target rapidly, some semblance of sight alignment is still required to be accurate.

4002. Breath Control

Proper breath control is critical to the aiming process. Breathing causes the body to move. This movement transfers to the rifle making it impossible to maintain proper sight picture. Breath control allows the Marine to fire the rifle at the moment of least movement.

Breath Control During Long-range or Precision Fire (Slow Fire)

It is critical that Marines interrupt their breathing at a point of natural respiratory pause before firing a long-range shot or a precision shot from any distance. A respiratory cycle lasts 4 to 5 seconds. Inhaling and exhaling each require about 2 seconds. A natural pause of 2 to 3 seconds occurs between each respiratory cycle. The pause can be extended up to 10 seconds. During the pause, breathing muscles are relaxed and the sights settle at their natural point of aim. To minimize movement, Marines must fire the shot during the natural respiratory pause. The basic technique is as follows:

- Breathe naturally until the sight picture begins to settle.
- Take a slightly deeper breath.
- Exhale and stop at the natural respiratory pause.
- Fire the shot during the natural respiratory pause.

Note

If the sight picture does not sufficiently settle to allow the shot to be fired, resume normal breathing and repeat the process.

Breath Control During All Other Combat Situations

A Marine in a combat environment may not have the time to fire a shot during the natural respiratory pause.

Figure 4-9. Sight Picture at Long-range Engagements.

Figure 4-10. Sight Picture at Short-range Engagements.

It may be necessary to take several deep breaths before holding the breath. A Marine should not make an exaggerated effort to perform breath control. A natural respiratory pause will help stabilize the shooter's sight picture. The basic technique is as follows:

- Take a deep breath filling the lungs with oxygen.

Note

It may be necessary to take several deep breaths quickly before holding the breath.

- Hold the breath and apply pressure to the trigger.
- Fire the shots.

4003. Trigger Control

Trigger control is the skillful manipulation of the trigger that causes the rifle to fire without disturbing sight alignment or sight picture. Controlling the trigger is a mental process, while pulling the trigger is a physical process.

Grip

A firm grip is essential for effective trigger control. The grip is established before starting the application of trigger control and it is maintained through the duration of the shot. To establish a firm grip on the rifle, position the "V" formed between the thumb and index finger on the pistol grip behind the trigger. The fingers and the thumb are placed around the pistol grip in a location that allows the trigger finger to be placed naturally on the trigger and the thumb in a position to operate the safety. Once established, the grip should be firm enough to allow manipulation of the trigger straight to the rear without disturbing the sights. See figure 4-11.

Trigger Finger Placement

Correct trigger finger placement allows the trigger to be pulled straight to the rear without disturbing sight alignment. The trigger finger should contact the trigger naturally. The trigger finger should not contact the rifle receiver or trigger guard.

Figure 4-11. Grip.

Types of Trigger Control

There are two techniques of trigger control: uninterrupted and interrupted

Uninterrupted Trigger Control

The preferred method of trigger control in a combat environment is uninterrupted trigger control. After obtaining sight picture, the Marine applies smooth, continuous pressure rearward on the trigger until the shot is fired.

Interrupted Trigger Control

Interrupted trigger control is used at any time the sight alignment is interrupted or the target is temporarily obscured. An example of this is extremely windy conditions when the weapon will not settle, forcing the Marine to pause until the sights return to his aiming point. To perform interrupted trigger control:

- Move the trigger to the rear until an error is detected in the aiming process.
- When this occurs, stop the rearward motion on the trigger, but maintain the pressure on the trigger, until sight picture is achieved.
- When the sight picture settles, continue the rearward motion on the trigger until the shot is fired.

Resetting the Trigger

During recovery, release the pressure on the trigger slightly to reset the trigger after the first shot is delivered (indicated by an audible click). Do not remove the finger from the trigger. This places the trigger in position to fire the next shot without having to reestablish trigger finger placement.

4004. Follow-Through/Recovery

Follow-Through

Follow-through is the continued application of the fundamentals until the round has exited the barrel. In combat, follow-through is important to avoid altering the impact of the round by keeping the rifle as still as possible until the round exits the barrel.

Recovery

It is important to get the rifle sights back on the target for another shot. This is known as recovery. Shot recovery starts immediately after the round leaves the barrel. To recover quickly, a Marine must physically bring the sights back on target as quickly as possible.

CHAPTER 5. RIFLE FIRING POSITIONS

In a combat environment, a Marine must be prepared to engage the enemy under any circumstance. There are four basic firing positions: prone, sitting, kneeling, and standing. These positions provide a stable foundation for effective shooting. Any firing position must provide stability, mobility, and observation of the enemy. During training, a Marine learns positions in a step-by-step process, guided by a series of precise movements until the Marine assumes a correct position. The purpose of this is to ensure that the Marine correctly applies all of the factors that assist him in holding the rifle steady. The Marine will gradually become accustomed to the feel of the positions through practice and eventually will be able to know instinctively whether his position is correct. In combat, it may not be possible to assume a textbook firing position due to terrain, available cover, engagement time, dispersion of targets, and other limiting factors. Modifications to the basic positions may have to be made to adjust to the combat environment. The Marine must strive to assume a position that offers stability for firing, maximum cover and concealment from the enemy, and maximum observation of the target.

Note

+The procedures in this manual are written for right-handed Marines; left-handed Marines should reverse instructions as necessary.

5001. Selecting a Firing Position

The selection of a firing position (prone, sitting, kneeling, standing) is based on terrain, available cover, dispersion of targets, and other limiting factors. A Marine must select a position that offers stability, mobility, and observation.

Stability

A firing position must provide a stable platform for accurate and consistent shooting. If the position is solid, the front sight can be held steady and the rifle sights should recover after recoil to the same position on the target. This allows for rapid reengagement of the enemy. The prone position provides the most stability for firing, while the standing position provides the least stability.

Mobility

A firing position must provide a Marine with the mobility required to move to new cover or to another area. The standing position permits maximum mobility, and it also allows the most lateral movement for engagement of widely dispersed targets. The prone position allows the least mobility and allows limited lateral movement.

Observation of the Enemy

A firing position must limit a Marine's exposure to the enemy, yet allow observation of the enemy. Manmade structures and terrain features (e.g., vegetation, earth contours) often dictate the shooting position. The standing position normally provides the best field of view, but it usually allows the most exposure to the enemy. The prone position normally allows the least exposure, but it usually provides a limited field of view.

5002. Types and Uses of the Rifle Web Sling

The rifle sling, when adjusted properly, provides maximum stability for the weapon, and helps hold the front sight still and reduce the effects of the rifle's recoil. Once a sling adjustment is found that provides maximum control of the weapon, the same sling adjustment should be maintained. Varying the sling tension extensively will affect the strike of the bullet, which will make maintaining a BZO difficult. Using the same sling adjustment will ensure the accuracy of rounds on target. There are two basic types of rifle sling adjustments: the hasty sling and loop sling.

Note

In training situations, the parade sling may be used. See paragraph 5008.

Hasty Sling

Application

The hasty sling is used in all firing positions. The hasty sling is advantageous in combat because it can be acquired quickly and it provides added stability to the rifle. The same sling setting can be used for all firing positions. If properly adjusted, the hasty sling supports the weight of the weapon, provides stability for the rifle, and reduces the effects of the rifle's recoil. When using the hasty sling, controlled muscle tension is applied to offer resistance against the sling, enabling the rifle sights to be held steady.

Donning the Hasty Sling

A Marine performs the following steps to form a hasty sling:

- Hold the rifle vertical with the barrel pointing upward.
- Unhook the J-hook from the lower sling swivel.
- Loosen the sling keeper.
- Adjust the sling until the J-hook hangs below the rifle butt. (The distance will vary based on the individual Marine, but the J-hook will usually hang approximately 3 to 10 inches below the rifle butt.) Secure the sling keeper. See figure 5-1.

Figure 5-1. J-hook Location.

- Turn the sling a half turn outboard to allow the sling to lay flat against the arm.
- Attach the J-hook to the lower sling swivel so the open end of the J-hook faces outboard, away from the rifle. See figure 5-2.
- While holding the rifle with the right hand, place the left arm through the sling near the lower sling swivel. Slide the arm up through the sling below the half twist. The sling makes contact low on the arm just below the triceps, above the elbow. The sling lies flat on the back of the arm.

Figure 5-2. J-hook Turned Outboard.

- With the left hand, grasp the handguard by pinching it in the "V" formed by the thumb and forefinger. The sling lies flat against the back or side of the wrist or on the arm near the wrist. See figure 5-3.

Figure 5-3. Sling Against the Wrist.

- Move the left hand as required to level the rifle with the line of sight. Placement of the forward hand controls the tension on the sling between the back of the wrist or arm and the upper sling swivel (see fig. 5-4). This hand placement, with a straight locked wrist, will cause the sling to pull straight under the handguards and serves to stabilize the front sight of the rifle.
- Move the feed end of the sling in or out of the sling keeper to adjust the hasty sling. Sling tension is in-

Figure 5-4. Position of Forward Hand.

creased by pushing the elbow outboard. See figure 5-5. (This enables one sling setting to fit all positions.) It is important for the hasty sling to be adjusted so it supports the rifle. The sling setting must allow the left elbow to push outboard against the sling so the elbow is not inverted under the rifle.

Figure 5-5. Position of Left Elbow.

- Locate the sling keeper near the feed end of the sling and secure so the backside or flat end of the sling keeper is against the arm.

Loop Sling

Application

The loop sling provides the greatest amount of stability during firing. This stability allows the Marine to perfect marksmanship fundamentals. A loop sling takes longer to don or remove than a hasty sling. Therefore, it has limited combat application and is best used where stability of hold is needed for a precision or long-range shot. The loop sling is used in the prone, sitting, and kneeling positions.

Donning the Loop Sling

- Place the rifle butt on the right hip and cradle the rifle in the right arm.
- Disconnect the J-hook from the lower sling swivel.
- With the M-buckle near the hook, feed the sling through the top of the M-buckle to form a loop large enough to slip over the arm. See figure 5-6.
- Give the loop a half turn outboard and insert the left arm through the loop, positioning the loop above the biceps. The loop is high on the left arm above the biceps muscle in such a position that it does not transmit pulse beat to the rifle.
- Position the M-buckle on the outside of the left arm. See figure 5-7.
- Tighten the loop on the left arm, ensuring the M-buckle moves toward the center of the arm as the loop tightens. The sling must pull from the center of the arm to be properly positioned. In this way, as tension is applied to the sling in the firing position, the loop will tighten.

To adjust the sling for the proper length, loosen the sling keeper and pull up or down (toward or away) from the loop. This adjustment varies with every individual and every firing position. The loop should not be tightened excessively on the arm. If blood flow is restricted, excessive pulse beat is transmitted through the rifle sling to the rifle and causes a noticeable, rhythmic movement of the rifle sights. When this occurs, a stable hold at the desired aiming point is impossible to achieve.

Figure 5-6. Forming a Loop.

Figure 5-7. Position of M-buckle.

Tension on the rifle sling is correct when it causes the rifle butt to be forced rearward into the pocket of the shoulder. This serves to keep the butt plate in the shoulder pocket during recoil. To increase tension on the rifle sling, the sling must be shortened. To lessen the tension, the rifle sling must be lengthened.

Move the sling keeper toward the left arm and secure it. The sling keeper should be positioned near the feed end of the sling.

Place the left hand over the sling from the left side and under the rifle. The rifle handguard should rest in the "V" formed between the thumb and forefinger and across the palm of the hand.

Move the left hand as required to achieve desired sight picture. Adjust the length of the sling for proper sling tension and support. See figure 5-8.

Figure 5-8. Loop Sling Donned.

5003. Factors Common to All Shooting Positions

There are seven factors that are common to all shooting positions that affect the ability to hold the rifle steady, maintain sight alignment, and control the trigger. The way these factors are applied differs slightly for each position, but the principles of each factor remain the same.

Left Hand

Placement of the left hand affects placement of left elbow, eye relief, stock weld, and sling tension.

Hasty Sling

In a hasty sling configuration, the sling is attached to the upper and lower sling swivels of the rifle. When the left arm is placed in the hasty sling, tension created by the sling travels from side to side. The tension created by the sling affects how the position is established. There are fundamental differences between the application of the seven factors when using the hasty sling. The most obvious of these is placement of the left hand and the left elbow.

To maximize the support provided by the hasty sling, the left elbow should not be inverted and under the rifle. Instead, the elbow should be pushed outboard against the sling. To achieve this, the position of the shooter's body must almost face the target as opposed to being perpendicular to the target. In addition, the hasty sling must be loosened to allow the elbow to push out against the sling far enough so that the elbow is not under the rifle.

The tension on the sling created by the hasty sling causes the center of balance to change on the rifle. When the elbow is under the rifle with the hasty sling donned, the sling pulls down on the sling swivel disrupting the center of balance and causing the muzzle to drop. Therefore, the elbow must be pushed outboard.

Outboard tension on the sling by the elbow drives the buttstock into the pocket of the shoulder. To enable this, the sling must make contact on the arm just below the triceps, above the elbow. See figure 5-9.

Figure 5-9. Position of Left Elbow with Hasty Sling.

To stabilize the front sight of the rifle, the forward hand, wrist, and forearm should be straight with the wrist locked in place; the hand should be rotated up so the rifle rests in the "V" formed by the thumb and index finger; the fingers will not curl around the handguards. Instead, they will pinch the handguard slightly

to keep the hand from slipping on the handguard during recoil. See figure 5-10.

Figure 5-10. Position of Left Hand with Hasty Sling.

When the wrist of the left hand is straight and locked, it creates resistance on the sling close to the muzzle. The sling is in contact with the back or side of the wrist or on the arm near the wrist. This resistance allows the front sight to be stabilized.

In contrast, when the rifle rests across the palm of the hand, the only resistance created is where the sling meets the triceps. Since the resistance is further from the muzzle of the rifle, it makes stabilizing the front sight more difficult.

Loop Sling

With the loop sling donned, the handguard of the rifle rests in the "V" formed by the thumb and index finger of the left hand. The rifle rests across the heel of the hand. The left elbow should be positioned under the weapon to create bone support and a consistent resistance to recoil. The fingers can curl around the handguard, but should apply only the minimum amount of pressure to prevent the hand from slipping on the handguard. See figure 5-11.

Figure 5-11. Position of Left Hand with Loop Sling.

Rifle Butt in the Pocket of the Shoulder

The rifle butt placed firmly in the pocket formed in the right shoulder provides resistance to recoil, helps steady the rifle, and prevents the rifle butt from slipping in the shoulder during firing. Consistent placement of the rifle butt in the shoulder pocket is essential to maintaining a BZO and firing tight shot groups.

Hasty Sling

With the hasty sling donned, the butt of the rifle is placed in the pocket of the shoulder. The body is squared to the target to provide a pocket for the butt of the weapon.

Outboard tension on the sling by the left elbow drives the buttstock into the pocket of the shoulder.

The rifle butt should be placed high in the shoulder to achieve a proper stock weld, allowing the Marine to bring the stock up to his head, rather than lower his head to the stock, which can degrade acquisition of sight alignment and sight picture. See figure 5-12.

Figure 5-12. Buttstock in the Shoulder with Hasty Sling.

Loop Sling

With the loop sling donned, the toe of the rifle butt is placed in the pocket of the shoulder. See figure 5-13.

Figure 5-13. Buttstock in the Shoulder with Loop Sling.

Grip of the Right Hand

Grasp the pistol grip with the right hand and place the forefinger on the trigger, with the thumb and remaining fingers wrapped around the pistol grip. See figure 5-14.

Figure 5-14. Grip of the Right Hand.

Firm rearward pressure should be exerted to help keep the rifle butt firmly in the shoulder, reducing the effects of recoil (this type of pressure is particularly true with the loop sling).

The trigger finger should be placed naturally on the trigger and care should be taken to ensure that the trigger finger can move independently without dragging on the side of the receiver. Proper placement of the right hand high on the pistol grip allows the trigger to be moved straight to the rear without disturbing sight alignment.

Right Elbow

The right elbow should be positioned naturally to provide balance to the position and create a pocket in the shoulder for the rifle butt. If the elbow is correctly positioned, it helps to form a pocket in the right shoulder where the rifle butt rests. The exact placement of the elbow varies with each shooting position but should remain consistent from shot to shot, ensuring the resistance to recoil remains constant. See figure 5-15.

Figure 5-15. Right Elbow.

Stock Weld

The placement of the shooter's cheek against the stock should remain firm and consistent from shot to shot. Consistency of stock weld is achieved through proper placement of the rifle butt in the pocket of the shoulder. A firm contact between the cheek and the stock enables consistent eye relief and enables the head and rifle to recoil as a single unit. Stock weld provides quick recovery between rapid fire shots, keeps the aiming eye centered in the rear sight aperture, and prevents the head from bouncing off the stock during recoil. The head should remain erect to allow the aiming eye to look straight through the rear sight aperture. See figure 5-16.

Figure 5-16. Stock Weld.

Breathing

Breathing causes chest movement and a corresponding movement in the rifle and its sights. Applying breath control will minimize this movement and the effect it has on aiming.

Muscular Tension/Relaxation

Muscular Tension–Hasty Sling

With the hasty sling donned, the shooter must apply an amount of controlled muscular tension in the left arm to keep the sling taut and stabilize the weapon sights. Resistance against the hasty sling controls the point at which the rifle sights will settle. The muscular tension is applied outward against the sling rather than in an effort to hold the rifle up. However, muscular tension should not be excessive to cause the shooter to shake, tremble, or experience fatigue.

Muscular Relaxation–Loop Sling

When using the loop sling, the muscles should be relaxed. Relaxation prevents undue muscle strain and reduces excessive movement. If proper relaxation is

achieved, natural point of aim and sight alignment are more easily maintained.

5004. Elements of a Good Shooting Position

There are three elements of a good shooting position that apply when using a loop sling: bone support, muscular relaxation, and natural point of aim. The three elements of a shooting position applied with the loop sling do not apply in the same way as when firing with a hasty sling. While some degree of bone support is still achieved with the hasty sling, muscular **tension** is applied rather than muscular **relaxation**. Natural point of aim, however, applies to both the loop sling and the hasty sling.

Bone Support

The body's skeletal structure provides a stable foundation to support the rifle's weight. A weak shooting position will not withstand a rifle's repeated recoil when firing at the sustained rate or buffeting from wind. To attain a correct shooting position, the body's bones must support as much of the rifle's weight as possible. Proper use of the sling provides additional support.

The weight of the weapon should be supported by bone rather than muscle because muscles fatigue whereas bones do not.

By establishing a strong foundation for the rifle utilizing bone support, the Marine can relax as much as possible while minimizing weapon movement due to muscle tension.

Muscular Relaxation

Once bone support is achieved, muscles are relaxed. Muscular relaxation helps to hold the rifle steady and increase the accuracy of the aim. Muscular relaxation also permits the use of maximum bone support to create a minimum arc of movement and consistency in resistance to recoil. Muscular relaxation cannot be achieved without bone support. During the shooting process, the muscles of the body must be relaxed as much as possible. Muscles that are tense will cause excessive movement of the rifle, disturbing the aim. When proper bone support and muscular relaxation are achieved, the rifle will settle onto the aiming point, making it possible to apply trigger control and deliver a well-aimed shot.

Natural Point of Aim

The point at which the rifle sights settle when in a firing position is called the natural point of aim.

Since the rifle becomes an extension of the body, it may be necessary to adjust the position of the body until the rifle sights settle naturally on the desired aiming point on the target.

When in a shooting position with proper sight alignment, the position of the tip of the front sight post will indicate the natural point of aim. When completely relaxed, the tip of the front sight post should rest on the desired aiming point.

One method of checking for natural point of aim is to aim in on the target, close the eyes, take a couple of breaths, and relax as much as possible. When the eyes are opened, the tip of the front sight post should be positioned on the desired aiming point while maintaining sight alignment.

For each shooting position, specific adjustments will cause the rifle sights to settle center mass, achieving a natural point of aim.

In all positions, the natural point of aim can be adjusted by—

- Varying the placement of the left hand in relation to the handguards.
- Moving the left hand forward on the handguards to lower the muzzle of the weapon, causing the sights to settle lower on the target.
- Moving the left hand back on the handguards to raise the muzzle of the weapon, causing the sights to settle higher on the target.
- Varying the placement of the stock in the shoulder.
- Moving the stock higher in the shoulder to lower the muzzle of the weapon, causing the sights to settle lower on the target.
- Moving the stock lower in the shoulder to raise the muzzle of the weapon, causing the sights to settle higher on the target.
- Natural point of aim can be adjusted right or left by adjusting body alignment in relation to the target.

In the prone position, if the natural point of aim is above or below the desired aiming point, move the

body slightly forward or back using the left elbow as a pivot and by digging the toes in.

- Pushing the body forward causes the sights to settle lower on the target.
- Pulling the body backward causes the sights to settle higher on the target.

In the kneeling and sitting positions, natural point of aim can be adjusted by varying the placement of the left elbow on the knee.

- Moving the left elbow forward on the knee lowers the muzzle of the weapon, causing the sights to settle lower on the target.
- Moving the left elbow back on the knee raises the muzzle of the weapon, causing the sights to settle higher on the target.

5005. Prone Position

Application

The prone position provides a very steady foundation for shooting and presents a low profile for maximum concealment. However, the prone position is the least mobile of the shooting positions and may restrict a Marine's field of view for observation. In this position, the Marine's weight is evenly distributed on the elbows, providing maximum support and good stability for the rifle.

Assuming the Prone Position

The prone position can be assumed by either moving forward or dropping backward into position, depending on the combat situation.

Moving Forward into Position

To move forward into the prone position, the Marine performs the following steps:

- With the hasty sling donned, stand erect and face the target, keeping the feet a comfortable distance apart (approximately shoulder width).
- Place the left hand on the handguard, the right hand on the pistol grip.
- Lower yourself into position by dropping to both knees (see fig. 5-17).

Figure 5-17. Dropping to Both Knees.

- Then shift the weight forward to lower the upper body to the ground using the right hand to break the forward motion. See figure 5-18.

Figure 5-18. Moving Forward Into Position.

Dropping Back into Position

It may be necessary to drop backward into position to avoid crowding cover, or to avoid covering uncleared terrain. To drop back into the prone position, the Marine performs the following steps:

- Face the target.
- Place the left hand on the handguard, the right hand on the pistol grip.
- Squat to the ground and break the fall with either hand (see fig. 5-19).
- Kick both legs straight to the rear (see fig. 5-20).
- If the fall was broken using the left hand, reestablish the hasty sling.

Figure 5-19. Breaking the Fall.

Figure 5-20. Kicking Back Into Position.

Straight Leg Prone Position with the Hasty Sling

Apply the seven factors to this position (para. 5003). To assume the straight leg prone position with the hasty sling, either move forward or drop back into position (see figs. 5-21, 5-22, and 5-23):

- Once on the ground, extend your left elbow in front of you. Stretch your legs out behind you. Spread the feet a comfortable distance apart with the toes pointing outboard and the inner portion of the feet in contact with the ground.
- As much of the body mass should be aligned directly behind the rifle as possible.
- If body alignment is correct, weapon recoil is absorbed by the whole body and not just the shoulder.
- Grasp the pistol grip with the right hand and place the rifle butt in the right shoulder pocket.
- Lower the head and place the cheek firmly against the stock to allow the aiming eye to look through the rear sight aperture.
- Rotate the left hand up, pinching the handguard between the thumb and forefinger.
- Slide both elbows outboard on the ground so there is outboard tension against the sling (moving the elbows out tightens the sling) and both shoulders are level. The elbows should provide a tripod of support with the body.
- Adjust the position of the left hand on the handguard to allow the sling to support the weapon and the front sight to be centered in the rear sight aperture. To adjust for elevation:
  - Move the left hand rearward or forward on the handguards (moving the hand rearward elevates the muzzle).
  - Open or close “V” of the left hand for small adjustments. (closing the “V” elevate the muzzle).
- To adjust for a minor cant in the rifle, rotate the handguard left or right in the “V” formed by the thumb and forefinger by rotating the pistol grip left or right.

Straight Leg Prone Position with the Hasty Sling

Figure 5-21. Front View.

Figure 5-22. Left View.

Figure 5-23. Right View.

Straight Leg Prone Position with the Loop Sling

Figure 5-24. Front View.

Figure 5-25. Left View.

Figure 5-26. Right View.

Straight Leg Prone Position with the Loop Sling

Apply the three elements and seven factors to this position (para. 5004). To assume straight leg prone position with the loop sling, either move forward or drop back into position (see figs. 5-24, 5-25, and 5-26):

- Once on the ground, roll the body to the left side as you extend and invert the left elbow on the ground. Stretch your legs out behind you. Spread the feet a comfortable distance apart with the toes pointing outboard and the inner portion of the feet in contact with the ground.
- As much of the body mass should be aligned directly behind the rifle as possible.
- If body alignment is correct, weapon recoil is absorbed by the whole body and not just the shoulder.
- Grasp the rifle butt with the right hand and place the rifle butt into the right shoulder pocket.
- Grasp the pistol grip with the right hand.
- Rotate the body to the right while the elbow is lowered to the ground so the shoulders are level. The right hand pulls and holds the rifle in the shoulder.
- Lower the head and place the cheek firmly against the stock to allow the aiming eye to look through the rear sight aperture.
- Move the left hand to a location under the handguard, which provides maximum bone support and stability for the weapon. This may require that you remove the rifle from the shoulder to reposition the left hand.

Cocked Leg Prone Position with the Hasty Sling

Figure 5-27. Front View.

Figure 5-28. Left View.

Figure 5-29. Right View.

Cocked Leg Prone Position with the Hasty Sling

Apply the seven factors to this position (para. 5003). To assume the cocked leg prone position with the hasty sling, either move forward or drop back into position (see figs. 5-27, 5-28, and 5-29):

- Once on the ground, roll the body to the left side. The left leg is stretched out behind you, almost in a straight line. This allows the mass of the body to be placed behind the rifle to aid in absorbing recoil.
- Turn the toe of the left foot inboard so the outside of the left leg and foot are in contact with the ground. Bend the right leg and draw it up toward the body to a comfortable position. Turn the right leg and foot outboard so the inside of the right boot is in contact with the ground. Cocking the leg will raise the diaphragm, making breathing easier.
- Grasp the pistol grip with the right hand and place the rifle butt in the right shoulder pocket.
- Lower the head and place the cheek firmly against the stock to allow the aiming eye to look through the rear sight aperture.
- Rotate the left hand up, pinching the handguard between the thumb and forefinger.
- Roll the body to the right while lowering the right elbow to the ground. Slide both elbows outboard on the ground so there is outboard tension against the sling (moving the elbows out tightens the sling). The right shoulder is higher than the left shoulder in the cocked leg position.
- Adjust the position of the left hand on the handguard to allow the sling to support the weapon and the front sight to be centered in the rear sight aperture. To adjust for elevation—
  - Move the left hand rearward or forward on the handguards (moving the hand rearward elevates the muzzle).
  - Open or close "V" of the left hand for small adjustments (closing the "V" elevates the muzzle).

To adjust for a minor cant in the rifle, rotate the handguard left or right in the "V" formed by the thumb and forefinger by rotating the pistol grip left or right.

Cocked Leg Prone Position with the Loop Sling

Apply the three elements and seven factors to this position (para. 5004). To assume the cocked leg prone position with the loop sling, either move forward or drop back into position (see figs 5-30, 5-31, and 5-32):

- Once on the ground, roll the body to the left side and extend and invert the left elbow on the ground. The left leg is stretched out behind you, almost in a straight line. This allows the mass of the body to be placed behind the rifle to aid in absorbing recoil.
- Turn the toe of the left foot inboard so the outside of the left leg and foot are in contact with the ground. Then bend the right leg and draw it up toward the body to a comfortable position. Turn the right leg and foot outboard so the inside of the right boot is in contact with the ground. Cocking the leg will raise the diaphragm, making breathing easier.
- Grasp the rifle butt with the right hand and place the rifle butt into the right shoulder pocket.

Cocked Leg Prone Position with the Loop Sling

Figure 5-30. Front View.

Figure 5-31. Left View.

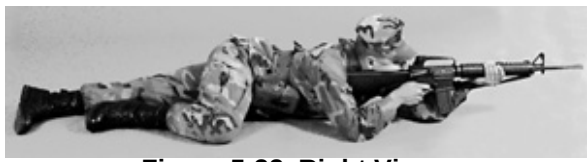


Figure 5-32. Right View.

- Grasp the pistol grip with the right hand.
- Roll the body to the right while lowering the right elbow to the ground. The right shoulder is higher than the left shoulder in the cocked leg position.
- Lower the head and place the cheek firmly against the stock to allow the aiming eye to look through the rear sight aperture.
- Move the left hand to a location under the handguard which provides maximum bone support and stability for the weapon.

5006. Sitting Position

There are three variations of the sitting position: crossed ankle, crossed leg, and open leg. Experiment with all the variations and select the position that provides the most stability for firing.

Although the sitting position provides an extremely stable base, it limits lateral movement and maneuver ability. It has several variations that can be adapted to the individual Marine. The sitting position provides greater elevation than the prone position while still having a fairly low profile.

Crossed Ankle Sitting Position with the Hasty Sling

The crossed ankle sitting position is an extremely stable shooting position. This position places most of the body's weight behind the weapon and aids in quick shot recovery. Apply the seven factors to this position (para. 5003). To assume the crossed ankle sitting position with the hasty sling (see figs. 5-33, 5-34, 5-35)—

- Square the body to the target.
- Grasp the handguard with the left hand.
- Bend at knees and break the fall with the right hand.
- Push backward with the feet to extend the legs and place the buttocks on the ground.
- Cross the left ankle over the right ankle.
- Grasp the pistol grip with the right hand and place the rifle butt in the right shoulder pocket.
- Lower the head and place the cheek firmly against the stock to allow the aiming eye to look through the rear sight aperture.
- Rotate the left hand up, pinching the handguard between the thumb and forefinger.
- Bend forward at the waist and place the flat portion of the back of the left arm, just above the elbow, on the left leg just below the knee.
- Place the right elbow on the inside of the right knee.
- Adjust the position to adjust sling tension. To tighten the sling: square the body more to the target, or move the left elbow out, or draw the feet up slightly toward the body.
- Adjust the position of the left hand to allow the sling to support the weapon and the front sight to be centered in the rear sight aperture.

To adjust for elevation:

- Move left hand rearward or forward on handguards (moving the hand rearward elevates the muzzle).
- Open or close the "V" of the left hand for small adjustments (closing the "V" elevates the muzzle).

To adjust for a minor cant in the rifle, rotate the handguard left or right in the "V" formed by the thumb and forefinger by rotating the pistol grip left or right.

Crossed Ankle Sitting Position with the Hasty Sling

Figure 5-33. Left View.

Figure 5-34. Front View.

Figure 5-35. Right View.

Crossed Ankle Sitting Position with the Loop Sling

Figure 5-36. Right View.

Figure 5-37. Front View.

Crossed Ankle Sitting Position with the Loop Sling

Apply the three elements and seven factors to this position (para. 5004). To assume crossed ankle sitting position with the loop sling (see figs. 5-36 and 5-37)—

- Position the body at approximately a 30-degree angle to the target.
- Place the left hand under the handguard.
- Bend at knees and break the fall with the right hand.
- Push backward with the feet to extend the legs and place the buttocks on the ground.
- Cross the left ankle over the right ankle.
- Bend forward at the waist and place the left elbow on the left leg below the knee.
- Grasp the rifle butt with the right hand and place the rifle butt into the right shoulder pocket.
- Grasp the pistol grip with the right hand.
- Lower right elbow to the inside of the right knee.
- Lower the head and place the cheek firmly against the stock to allow the aiming eye to look through the rear sight aperture.
- Move the left hand to a location under the handguard, which provides maximum bone support and stability of the weapon.

Crossed Leg Sitting Position with the Hasty Sling

The crossed leg sitting position provides a medium base of support and places some of the body's weight behind the weapon for quick recovery after each shot. Apply the seven factors to this position (para. 5003). To assume the crossed leg sitting position with the hasty sling (see figures 5-38, 5-39, and 5-40)—

- Square the body to the target.
- Grasp the handguard with the left hand.
- Bend at the knees while breaking the fall with the right hand.
- Place the buttocks on the ground as close to the feet as you comfortably can.
- Cross the left leg over the right leg.
- Grasp the pistol grip with the right hand and place the rifle butt in the right shoulder pocket.

Crossed Leg Sitting Position with the Hasty Sling

Figure 5-38. Left View.

Figure 5-39. Front

Figure 5-40. Right View.

- Lower the head and place the cheek firmly against the stock to allow the aiming eye to look through the rear sight aperture.
- Rotate the left hand up, pinching the handguard between the thumb and forefinger.
- Bend forward at the waist while placing the left elbow into the bend of the knee or placing the flat portion of the back of the left arm, just above the elbow, in front of the knee.
- Place the right elbow on the inside of the right knee.
- Adjust the position to adjust sling tension. Squaring the body more to the target or drawing the feet closer together tightens the sling by forcing the left elbow outboard.
- Adjust the position of the left hand to allow the sling to support the weapon and the front sight to be centered in the rear sight aperture.

To adjust for elevation:

- Move left hand rearward or forward on handguards (moving the hand rearward elevates the muzzle).
- Open or close the "V" of the left hand for small adjustments (closing the "V" elevates the muzzle).

To adjust for a minor cant in the rifle, rotate the handguard left or right in the "V" formed by the thumb and forefinger by rotating the pistol grip left or right.

Crossed Leg Sitting Position with the Loop Sling

Apply the three elements and seven factors to this position (para. 5004). To assume crossed leg sitting position with loop sling (see figs. 5-41, 5-42, and 5-43)—

- Position body at a 45- to 60-degree angle to target.
- Place the left hand under the handguard.
- Cross the left leg over the right leg.
- Bend at the knees while breaking the fall with the right hand.
- Place the buttocks on the ground as close to the crossed legs as you comfortably can.
- Bend forward at the waist while placing the left elbow on the left leg into the bend of the knee.
- Grasp the rifle butt with the right hand and place the rifle butt into the right shoulder pocket.
- Grasp the pistol grip with the right hand.
- Lower right elbow to the inside of the right knee.
- Lower the head and place the cheek firmly against the stock to allow the aiming eye to look through the rear sight aperture.
- Move the left hand to a location under the handguard which provides maximum bone support and stability of the weapon.

Open Leg Sitting Position with the Hasty Sling

The open leg sitting position provides a medium base of support and is most commonly used when firing from a forward slope. Apply the seven factors to this position (para. 5003). To assume the open leg sitting position with the hasty sling (see figs. 5-44, 5-45, and 5-46)—

- Square the body to the target.
- Place the feet approximately shoulder width apart.
- Grasp the handguard with the left hand.
- Bend at the knees while breaking the fall with the right hand.
- Push backward with the feet to extend the legs and place the buttocks on the ground.
- Grasp the pistol grip with the right hand and place the rifle butt in the right shoulder pocket.
- Lower the head and place the cheek firmly against the stock to allow the aiming eye to look through the rear sight aperture.

Crossed Leg Sitting Position with the Loop Sling

Figure 5-41. Left View.

Figure 5-42. Front View.

Figure 5-43. Right View.

Open Leg Sitting Position with the Hasty Sling

Figure 5-44. Left View.

Figure 5-45. Front View.

Figure 5-46. Right View.

- Rotate the left hand up, pinching the handguard between the thumb and forefinger.
- Place the flat portion of the back of the left arm, just above the elbow, in front of the left knee.
- Place the right elbow on the inside of the right knee or place the flat portion of the back of the right arm, just above the elbow, in front of the knee.
- Adjust the position to adjust sling tension. Widening the stance tightens the sling by forcing the left elbow outboard. There must be some controlled muscular tension in the legs to hold them up and offer resistance to recoil.
- The position of the left hand to allow the sling to support the weapon and the front sight to be centered in the rear sight aperture.

To adjust for elevation:

- Move left hand rearward or forward on handguards (moving the hand rearward elevates the muzzle).
- Open or close the "V" of the left hand for small adjustments (closing the "V" elevates the muzzle).

To adjust for a minor cant in the rifle, rotate the handguard left or right in the "V" formed by the thumb and forefinger by rotating the pistol grip left or right.

Open Leg Sitting Position with the Loop Sling

Apply the three elements and seven factors to this position (para. 5004). To assume the open leg sitting position with the loop sling (see figs. 5-47, 5-48, and 5-49 on page 5-16)—

- Position the body at approximately a 30-degree angle to the target.
- Place the feet approximately shoulder width apart.
- Place the left hand under the handguard.
- Bend at the knees while breaking the fall with the right hand.
- Push backward with the feet to extend the legs and place the buttocks on the ground.
- Place the left elbow on the inside of the left knee.
- Grasp the rifle butt with the right hand and place the rifle butt into the right shoulder pocket.
- Lower right elbow to the inside of the right knee.
- Lower the head and place the cheek firmly against the stock to allow the aiming eye to look through the rear sight aperture.
- Move the left hand to a location under the handguard which provides maximum bone support and stability of the weapon.

5007. Kneeling Position

Description

The kneeling position is quick to assume and easy to maneuver from. It is usually assumed after initial engagement has been made from a standing position. It can easily be adapted to available cover. A tripod is formed by the left foot, right foot, and right knee when the Marine assumes the position, providing a stable foundation for shooting. The kneeling position also presents a higher profile to facilitate a better field of view as compared to the prone and sitting positions.

Assuming the Kneeling Position

The kneeling position can be assumed by either moving forward or dropping back into position, depending on the combat situation. For example, it may be necessary to drop back into position to avoid crowding cover, or to avoid covering uncleared terrain.

Open Leg Sitting Position with the Loop Sling

Figure 5-47. Left View.

Figure 5-48. Front View.

Figure 5-49. Right View.

Moving Forward into Position

To move forward into the kneeling position, the Marine steps forward toward the target with his left foot and kneels down on his right knee.

Dropping Back into Position

To drop back into the kneeling position, the Marine leaves his left foot in place and steps backward with his right foot and kneels down on his right knee.

High Kneeling Position with the Hasty Sling

Apply the seven factors to this position (para. 5003). To assume the high kneeling position with the hasty sling, either move forward or drop back into position (see figs. 5-50, 5-51, and 5-52):

- Square the body to the target.
- Keep the right ankle straight, with the toe of the boot in contact with the ground and curled under by the weight of the body.
- Place the right portion of the buttocks on or over the right heel. Contact with the heel provides more stability to the position, however, it is not mandatory that the buttocks make contact.
- Place the left foot forward to a point that allows the shin to be vertically straight. For the shin to be vertical, the heel should be directly under the knee. The left foot must be flat on the ground. To provide a wider base of support, slide the right knee and left foot outboard to form a tripod with the right foot.
- Grasp the pistol grip with the right hand and place the rifle butt in the right shoulder pocket.
- Lower the head and place the cheek firmly against the stock to allow the aiming eye to look through the rear sight aperture.
- Rotate the left hand up, pinching the handguard between the thumb and forefinger. The left hand will not grasp the slip ring or the magazine. The magazine must be on the inside of the left arm.
- Place the flat portion of the back of the upper left arm, just above the elbow, on the left knee or against the inside of the left knee so it is in firm

High Kneeling Position with the Hasty Sling

Figure 5-50. Left View.

Figure 5-51. Front View.

Figure 5-52. Right View.

contact. The upper portion of the triceps or the armpit will not rest on the knee.

- Bend the right elbow to provide the least muscular tension possible, lowering it to a natural position.
- Adjust the position to adjust sling tension. Widening the stance by moving the left foot and knee outboard will allow the sling to be tightened.
- Adjust the position of the left hand to allow the sling to support the weapon and the front sight to be centered in the rear sight aperture.

To adjust for elevation:

- Move left hand rearward or forward on handguards (moving the hand rearward elevates the muzzle).
- Open or close the "V" of the left hand for small adjustments (closing the "V" elevates the muzzle).

To adjust for a minor cant in the rifle, rotate the handguard left or right in the "V" formed by the thumb and forefinger by rotating the pistol grip left or right.

High Kneeling Position with the Loop Sling

Apply the three elements and seven factors to this position (para. 5004). To assume the high kneeling position with the loop sling, either move forward or drop back into position (see figs. 5-53, 5-54, and 5-55):

- Position the body at a 45-degree angle to the target.
- Place the left hand under the handguard.
- Kneel down on right knee so right lower leg is approximately parallel to the target (45 to 90 degrees).
- Keep the right ankle straight, with the toe of the boot in contact with the ground and curled under by the weight of the body.
- Place the right portion of the buttocks on or over the right heel; contact with the heel provides more stability to the position.
- Place the left foot forward to a point that allows the shin to be vertically straight. For the shin to be vertical, the heel should be directly under the knee. The left foot must be flat on the ground since it will be supporting the majority of the weight.
- Place the flat portion of the back of upper left arm, just above the elbow, on the left knee so it is in firm contact with the flat surface formed on top of the bent knee. The point of the left elbow will extend just slightly past the left knee. The upper portion of the triceps or the armpit will not rest on the knee.
- Lean slightly forward into the sling for support.
- Grasp the rifle butt with the right hand and place the rifle butt into the right shoulder pocket.
- Grasp the pistol grip with the right hand.
- Bend the right elbow to provide the least muscular tension possible and lower it to a natural position.
- Lower the head and place the cheek firmly against the stock to allow the aiming eye to look through the rear sight aperture.
- Move the left hand to a location under the handguard, which provides maximum bone support and stability for the weapon.

Medium Kneeling Position

This is also referred to as the bootless kneeling position. Assume the medium kneeling position in the same way as the high kneeling position with the ex-

High Kneeling Position with the Loop Sling

Figure 5-53. Left View.

Figure 5-54. Front View.

Figure 5-55. Right View.

ception of the right foot. The right ankle is straight and the foot is stretched out with the bootlaces in contact with the ground. The buttocks are in contact with the heel of the right foot. See figure 5-56.

Figure 5-56. Medium Kneeling Position.

Low Kneeling Position

The low kneeling position is most commonly used when firing from a forward slope. Assume the low kneeling position in the same way as the high kneeling position with the exception of the placement of the right foot. Turn the right ankle so the outside of the foot is in contact with the ground and the buttocks are in contact with the inside of the foot. See figure 5-57.

Figure 5-57. Low Kneeling Position.

5008. Standing Position

Description

The standing position is the quickest position to assume and the easiest to maneuver from. It allows greater mobility than other positions. The standing position is often used for immediate combat engagement. The standing position is supported by the shooter's legs and feet and provides a small area of contact with the ground. In addition, the body's center of gravity is high above the ground. Therefore, maintaining balance is critical in this position.

Standing Position with the Hasty Sling

Apply the seven factors to this position (para. 5003). To assume the standing position with the hasty sling (see figs. 5-58, 5-59, and 5-60)—

- Square the body to the target.
- Spread the feet apart to a comfortable distance with the left foot slightly in front of the right foot. This distance may be wider than shoulder width.
- Distribute the weight evenly over both feet and hips. Balance will shift forward slightly to reduce recovery time and increase the stability of the hold. The legs should be slightly bent for balance.
- Grasp the pistol grip with the right hand and place the rifle butt in the right shoulder pocket.
- Bring the rifle sights up to eye level instead of lowering the head to the sights and place the cheek firmly against the stock. Ensure the head is erect so the aiming eye can look through rear sight aperture.
- Rotate the left hand up, pinching the handguard between the thumb and forefinger.
- The left hand will be under the handguard with the thumb on the outboard side of the handguard.The left hand will not grasp the slip ring or magazine. The magazine must be on the inside of the left arm.
- Hold the right elbow in a natural position.
- Adjust the position of the left hand on the handguard to allow the sling to support the weapon and front sight to be centered in the rear sight aperture.

To adjust for elevation:

- Move left hand rearward or forward on handguards (moving the hand rearward elevates the muzzle).
- Open or close the "V" of the left hand for small adjustments (closing the "V" elevates the muzzle).
- Adjust the position to adjust sling tension. Moving the left elbow out or squaring the body more to the target tightens the sling.

To adjust for a minor cant in the rifle, rotate the handguard left or right in the "V" formed by the thumb and forefinger by rotating the pistol grip left or right.

Standing Position with the Hasty Sling

Figure 5-58. Left View.

Figure 5-59. Front View.

Figure 5-60. Right View.

Standing Position with the Parade Sling

The parade sling is used to emphasize marksmanship fundamentals while firing from the standing position on KD courses during entry-level training. To achieve proper positioning of the parade sling, perform the following steps:

- Attach sling to rifle by placing feed end of sling down through the upper sling swivel.
- Place feed end of sling through sling keeper and lock into place.
- Attach J-hook to lower sling swivel.
- Pull feed end of sling through sling keeper until sling is taut.
- Move sling keeper down near feed end of sling.
- Lock sling keeper into place.

Perform the following steps to assume the standing position with a parade sling (figure 5-61):

- Stand erect.
- Face approximately 90 degrees to the right of the line of fire.
- Place feet approximately shoulder width apart.
- Place left hand under handguard.
- Grasp pistol grip with right hand.
- Place rifle butt into right shoulder pocket.
- Invert left elbow across rib cage.
- Rest left arm naturally against rib cage.
- Lower right elbow to a natural position.
- Place cheek firmly against stock to obtain a firm stock weld.

Figure 5-61. Standing Position with the Parade Sling.

CHAPTER 6. USE OF COVER AND CONCEALMENT

Note

+The procedures in this manual are written for right-handed Marines; left-handed Marines should reverse instructions as necessary.

6001. Cover and Concealment

In a combat environment, a Marine must be prepared to fire from any type of cover or concealment. Cover is anything that protects a Marine from enemy fire. Cover may be an existing hole, a hastily dug shelter, or a well-prepared fighting position with overhead protection. Concealment is anything that hides a Marine from enemy view, but it may not afford protection. Concealment can be obtained from buildings, trees, crops, and skillful use of ground contours. A Marine can use any object or terrain feature that protects him from enemy fire, hides him from enemy view, allows him to observe the enemy, and provides support for a firing position.

Types of Cover

Frontal Cover

A firing position should have frontal cover that provides protection from small arms fire and indirect fire fragments. Ideally, frontal cover should be thick enough to stop small arms fire, high enough to provide protection from enemy fire, and wide enough to provide cover when firing to the left or right edge of a sector of fire.

Ideal Cover

The ideal cover provides:

- Overhead, flank, and rear protection from direct and indirect fire.
- Free use of personal weapons.
- Concealment from enemy observation.
- A concealed route in and out.
- Unobstructed view of the sector of fire.

Common Cover Materials

Any material that protects a Marine from small arms fire can be used for cover. Some common materials include sandbags, trees, logs, and building debris. Table 6-1 presents some common materials and their minimum thickness required for protection from small arms fire.

Table 6-1. Minimum Thickness for Protection Against Small Arms.

Material	Minimum Thickness (in inches)
Concrete	7
Broken stone (rubble)	20
Dry sand	24
Wet sand	35
Logs (oak)	40
Earth (packed)	48

Sandbags

Cover can be improved and positions can be fortified by filling sandbags with dirt/sand and placing them around the position. Sandbags should be tightly packed because bullets can easily penetrate moist or loosely packed sandbags. Overlapping sandbags increase protection and decrease the bullet's ability to penetrate the sandbag. A minimum thickness of three sandbags is required to stop small arms fire.

Trees/Logs

Wood is a relatively dense material and offers good cover and protection. Bullets have a tendency to fragment when they penetrate wood. Live trees have a greater resistance to bullet penetration than dead trees. Wood that has been treated with creosote, such as telephone poles and railroad ties, offers better protection from projectiles than untreated wood, but it still does not ensure protection from small arms fire.

Cinder Bocks

Cinderblocks are not impenetrable cover. Although they are made of a dense material, the composition of a cinderblock is so brittle that a bullet can shatter the

block upon impact. This can cause injury to a Marine by secondary fragmentation.

Firing From Specific Types of Cover

Effective cover allows a Marine to engage enemy targets while protecting himself from enemy fire. Several types of cover provide support, protection, and concealment and do not interfere with target engagement. A Marine must adapt firing positions to the type of cover available.

Fighting Hole

A Marine should use fighting holes if available. See figure 6-1. After a Marine enters the fighting hole, he adds or removes dirt, sandbags or other supports to fit his height. To assume a firing position, a Marine performs the following steps:

- Place the right foot to the rear as a brace.
- Lean forward until the chest is against the forward wall of the fighting hole.
- Extend the left arm and elbow over the forward side of the fighting hole so the left forearm rests against the back of the parapet.
- Place the rifle butt into the pocket of the right shoulder and grasp the pistol grip with the right hand.
- Place the right elbow on solid support using the elbow rest of the fighting hole or sandbags placed around the fighting hole.

Figure 6-1. Fighting Hole Position.

Rooftop

If possible, a Marine's entire body should be positioned behind the apex of the rooftop, using the apex to support the rifle. See figure 6-2. If the body cannot be positioned behind the apex, place the left arm over the apex of the roof to hold the weight of the body. Expose as little of the head and shoulders as possible. See figure 6-3.

Figure 6-2. Rooftop Position Behind the Apex.

Figure 6-3. Rooftop Position Supported by the Apex.

Window

The Marine can establish a supported or unsupported position from a window.

Unsupported. A Marine can establish an unsupported position back from the opening of the window so that the muzzle does not protrude and interior shadows provide concealment so as not to provide a silhouette to the enemy. See figure 6-4.

Figure 6-4. Unsupported Window Position.

Supported. When additional stability is needed, a Marine can establish a supported position by placing the rifle handguards or his forearm in the "V" formed by the side and bottom of the windowsill. A drawback to this technique is that the muzzle of the weapon and the Marine may be exposed to view. See figures 6-5 and 6-6.

Vehicle

In many combat situations, particularly in urban environments, a vehicle may be the best form of cover. When using a vehicle for cover, the engine block provides the most protection from small arms fire. The Marine should establish a position behind the front wheel so the engine block is between him and the target (see figs. 6-7 and 6-8). From this position, the Marine may fire over, under or around the vehicle. This is a particularly effective position for larger vehicles that are high off the ground.

The Marine can establish additional support for the rifle by positioning himself behind the doorjamb (frame of door) and placing the rifle against the "V" formed by the open door and doorframe (see figure 6-9). From this position, the Marine may fire over the hood of the vehicle while using the engine block for protection.

Figure 6-5. Supported Window Position (Handguards on Support).

Figure 6-6. Supported Window Position (Forearm on Support).

Figure 6-7. Firing Around Front of Vehicle.

Figure 6-8. Firing Over Front of Vehicle.

Figure 6-9. Establishing a Supported Position in a Vehicle.

However, this position limits lateral mobility and it is more difficult to maneuver from.

At the back of the vehicle, only the axle and the wheel provide cover. If the Marine must shoot from the back of the vehicle, he must position himself directly behind the wheel as much as possible (see fig. 6-10).

Figure 6-10. Using the Back of a Vehicle for Cover.

6002. Supported Firing Positions

Supports are foundations for positions; positions are foundations for the rifle. To maximize the support the position provides, the firing position should be adjusted to fit or conform to the shape of the cover. Elements of a sound firing position, such as balance and stability, must be incorporated and adjusted to fit the situation and type of cover. A supported firing position should minimize exposure to the enemy, maximize the stability of the rifle, and provide protection from enemy observation and fires. A Marine can use any available support (e.g., logs, rocks, sandbags or walls) to stabilize his firing position. The surrounding combat environment dictates the type of support and position used.

Considerations Using Cover and Concealment

Cover and concealment considerations are similar, regardless of the combat environment (e.g., urban, desert, jungle).

Adjusting the Shooting Position

The type of cover can dictate which shooting position (e.g., standing, kneeling, sitting, and prone) will be the most effective. For example, a Marine's height in relation to the height of the cover aids in the selection of a firing position.

The firing position selected should be adjusted to fit the type of cover to:

- Provide stability. The position should be adjusted to stabilize the rifle sights and allow the management of recoil to recover on target.
- Permit mobility. The position should be adjusted to permit lateral engagement of dispersed targets and movement to other cover.
- Allow observation of the area/enemy while minimizing exposure to the enemy.

The firing position is adjusted to fit the type of cover by adjusting the seven factors (i.e., left hand, pocket of shoulder, right elbow, stock weld, grip of right hand) to support the rifle or the position.

Keeping the Entire Body Behind Cover

A Marine should minimize exposure of any part of his body to fire. Be especially aware of the head, right elbow, knees or any other body part that may extend beyond the cover.

Figure 6-11. Firing from the Right Side of Cover.

Firing From the Right or Left Side of Cover

To minimize exposure and maximize the cover's protection, a right-handed Marine should fire from the right side of cover and a left-handed Marine should fire from the left side, if possible (see fig. 6-11).

If, however, a right-handed Marine must fire from the left side of cover, he fires right-handed but adjusts his position behind cover and uses the rollout technique (see para. 6003) to engage the target. See figure 6-12.

Figure 6-12. Firing from the Left Side of Cover.

Firing Over the Top of Cover

Firing over the top of cover provides a wider field of view and lateral movement. When firing over the top of cover, the position may be supported and stabilized by resting the handguard or the left forearm on the cover (see fig. 6-13). The Marine should keep as low a profile as possible; the rifle should be as close to the top of cover as possible.

Figure 6-13. Firing Over the Top of Cover.

Maintaining Muzzle Awareness

When firing over the top of cover, a Marine must remember that the sights are higher than the barrel and remain aware of the location of his muzzle. Therefore, a Marine must maintain a position that ensures the muzzle is high enough to clear the cover (e.g., window sill, top of wall) as he obtains sight alignment/sight picture on the target (see figs. 6-14a and 6-14b).

Clearing the Ejection Port

Ensure the cover does not obstruct the ejection port. If the ejection port is blocked, the obstruction can interfere with the ejection of the spent cartridge case and cause a stoppage.

Figures 6-14a and 6-14b. Clearing Cover with the Muzzle.

Resting the Magazine

The bottom, front or side of the rifle magazine can rest on or against support to provide additional stability (see figs. 6-15, 6-16, and 6-17).

CAUTION

The back of the magazine should not be pulled back against support because it can cause a stoppage by not allowing a round to feed from the magazine.

Seven Factors

The seven factors (left hand, rifle in shoulder pocket, stock weld, right elbow, grip of the right hand, breathing, muscular tension) are applied when firing from cover, however, some may have to be modified slightly to accommodate the artificial support provided the rifle and position.

Left Hand

The support should be used to help stabilize both the firing position and the rifle to enable the Marine to maintain sight alignment and sight picture.

The forearm or left hand can contact the support to stabilize the weapon. Rest the forearm or the meaty portion of the bottom of the left hand on the support and rest the rifle in the "V" formed by the thumb and forefinger of the left hand (see fig. 6-18).

The rifle's handguards may rest on the support, but the barrel may not (see fig. 6-19). Placement of left hand on the handguard may have to be adjusted forward or back to accommodate the cover and the additional support provided by the rifle resting on the cover. If the handguards are resting on the cover, the left hand

Figure 6-15. Bottom of Magazine on Support.

Figure 6-16. Front of Magazine on Support.

Figure 6-17. Side of Magazine on Support.

can pull down on the handguards to further stabilize the weapon.

Rifle in Shoulder Pocket

Regardless of the combat situation or the height of the cover, the rifle butt must remain in the shoulder pocket to manage the effects of recoil, stabilize the rifle, and maintain the rifle's battlesight zero. The firing position must be adjusted behind cover to enable the rifle to be placed in the shoulder.

Stock Weld

Regardless of the cover, the firing position must be adjusted to allow stock weld to be achieved. Proper stock weld provides quick recovery between shots and keeps the aiming eye centered in the rear sight aperture.

Right Elbow

The right elbow can be placed on or against the support to stabilize the weapon and the position. Ensure the elbow is not extended beyond cover revealing the position to the enemy.

Grip of the Right Hand

If rifle handguards, forward hand, or forearm rest on cover for support, the grip of the right hand should pull back and down on the pistol grip to further stabilize the weapon in the shoulder and on the support.

Breathing

Breathing does not change when firing from a supported position.

Muscular Tension

To create balance and support for the position, the Marine may shift his body weight into or against the support (see fig. 6-20). This enables the Marine to use cover to support his body weight, reducing the need for muscular tension.

Figure 6-18. Forearm Resting on Cover.

Figure 6-19. Handguards Resting on Cover.

Figure 6-20. Shifting Body Weight into Cover.

Types of Supported Positions

Supported Prone

If possible, a Marine should use the supported prone position when firing from behind cover. This position is the steadiest, provides the lowest silhouette, and provides maximum protection from enemy fire.

- Support the position by placing the handguards, the forearm, or the magazine on or against support (see fig. 6-21).

Figure 6-21. Supported Prone.

- The prone position can be assumed behind a tree, a wall, a log, or almost any type of cover. It is flexible and allows shooting from all sides of cover and from cover of various sizes.
- The body must be adjusted to conform to the cover. For example, if the cover is narrow, keep the legs together. The body should be in line with the rifle and directly behind the rifle (see figs. 6-22 and 6-23). This presents a smaller target to the enemy and provides more body mass to absorb recoil.

Figure 6-22. Supported Prone Behind Narrow Cover—Rear View.

Supported Kneeling

When the prone position cannot be used because of the height of the support, the supported kneeling position may be appropriate. The kneeling position provides additional mobility over the prone position.

- The kneeling position allows shooting from all sides and from cover of varying sizes. This position may be altered to maximize the use of cover or support by assuming a variation of the kneeling position (high, medium or low).
- In the kneeling position, the Marine must not telegraph his position behind the cover with his knee. When shooting around the sides of cover, the Marine should strive to keep his right knee in line with his left foot so as not to reveal the position to the enemy. See figure 6-24.
- Support the position by placing the handguards, the forearm, or the magazine on or against support. In addition, the position (e.g., a knee, the side of the body) may rest against support (see fig. 6-25).
- If the rifle is resting on support, the Marine may not need to stabilize the weapon by placing his left elbow on his knee (see fig. 6-26).

Supported Sitting

A supported sitting position may be used to fire over the top of cover when mobility is not as critical. A sitting position can be comfortably assumed for a longer period of time than a kneeling position and it can conform to higher cover when a prone position cannot be used.

Figure 6-23. Supported Prone Behind Narrow Cover—Front View.

Figure 6-24. Supported Kneeling.

Figure 6-25. Supported Kneeling with Body Against Support.

- Support the position by placing the handguards, the forearm, or the magazine on or against support (see fig. 6-27).

- If the rifle is resting on support, the Marine may not need to stabilize the weapon by placing his left or right elbows on his legs (see fig. 6-28).

Supported Standing

The supported standing position provides greater mobility than the other positions and usually provides greater observation of the enemy. The supported standing position is effectively used behind high cover (e.g., window, over a wall) or narrow cover (e.g., tree, telephone pole).

- To assume the supported standing position, the Marine leans his body forward or against support to stabilize the weapon and the position.

Figure 6-26. Supported Kneeling with Rifle Resting on Support.

Figure 6-27. Supported Sitting.

Figure 6-28. Supported Sitting with Rifle on Support.

- Support the position by placing the handguards, the forearm, or the magazine on or against support. In addition, the position (e.g., the side of the body) may rest against support (see fig. 6-29).

Figure 6-29. Supported Standing.

6003. Searching for and Engaging Targets From Behind Cover

To locate targets when behind cover or to ensure the area is clear before moving, the Marine must expose as little of himself as possible to the enemy. Additionally, the Marine must be ready to fire if a target is located. Two techniques that can be used to locate and engage targets from behind cover are: the pie and rollout. These techniques minimize the Marine's exposure to enemy fire while placing the Marine in a position to engage targets or to move to another location if necessary. These techniques are also used to enter a building or structure. Both techniques are used in the kneeling and standing positions. To be accurate in engaging targets using either technique, the seven factors must be applied. See page 6-6 for a discussion of seven factors.

Pie Technique

To perform the pie technique:

- Staying behind cover, move back and away from the leading edge of the cover. The surroundings and situation will dictate the distance you should move back and away from the cover. Generally, the further back the Marine is from cover, the greater his area of observation; staying too close to cover decreases the area of observation. However, if the Marine is too far back from the leading edge of cover, he may unknowingly expose himself to the enemy.
- Assume a firing position and lower the rifle sights enough to have a clear field of view, orienting the muzzle on the leading edge of the cover. (In a building, the baseboards serve as a reference point for the muzzle of the rifle when searching for targets.)
- Taking small side steps, slowly move out from behind the cover, covering the field of view with the aiming eye and muzzle of the weapon. Wherever the eyes move, the muzzle should move (eyes, muzzle, target). The muzzle should remain on the leading edge of cover, serving as a pivot point when moving out.
- Continue taking small side steps and moving out from cover until a target is identified or the area is found to be clear.
- When a target is identified, sweep the safety, place the finger on the trigger, and engage the target.

Rollout Technique

To perform the rollout technique:

- Staying behind cover, move back and position the body so it is in line with the leading edge of the cover, ensuring that no part of the body extends beyond the cover.
- Assume a firing position and come to the Ready, ensuring the muzzle is just behind the cover.
- Canting the head and weapon slightly, roll the upper body out to the side just enough to have a clear field of view and allow the muzzle to clear the cover. Keeping the feet in place, push up on the ball of one foot to facilitate rolling out.
- Continue rolling out from cover until a target is identified or the area is found to be clear.
- When a target is identified, sweep the safety, place the finger on the trigger, and engage the target.
- If a target is identified before moving out from cover, the rifle should be taken off safe before moving out using the rollout technique.

Combining Techniques

In some situations, it may be necessary to combine the pie and rollout techniques to search an entire area for targets (e.g., corner of a building, a doorway). Changing from one technique to another may permit the Marine to minimize his exposure to enemy observation and fires.

6004. Moving Out From Behind Cover

A Marine must be constantly aware of his surroundings and available cover, should a threat appear. He should avoid obvious danger areas and move quickly through danger areas that cannot be avoided.

When moving from cover to cover, the Marine should select the next covered location and plan his route before moving from his present position. This is done by quickly looking from behind cover to ensure the area is clear, ensuring the head and eyes are exposed for as short a time as possible.

If necessary, the Marine should conduct a Condition 1 reload before moving from cover.

Once the Marine is committed to moving, all focus should be on moving until cover is reassumed.

CHAPTER 7. RIFLE PRESENTATION

Note

+ The procedures in this manual are written for right-handed Marines; left-handed Marines should reverse instructions as necessary.

7001. Presentation of the Rifle

In a combat environment, targets may present themselves with little or no warning. To maintain an advantage, the Marine carries his weapon in a position appropriate to the threat level that permits the rifle to be both easily carried and presented as quickly as possible. A carry is also established based on the situation such as moving in a close quarter environment, moving over or under objects, etc.

Presenting the Rifle From the Tactical Carry

The Marine uses the Tactical Carry when no immediate threat is present. This carry permits the rifle to be easily carried for long periods of time, but it does not permit the quickest presentation to a target. If the situation changes and a target presents itself, a Marine performs the following steps to present the rifle from the Tactical Carry once a target appears:

- Extend the rifle toward the target keeping the muzzle slightly up so the buttstock clears all personal equipment. Continue to look at the target.
- At the same time, place the rifle in Condition 1. Two methods can be used to place rifle in Condition 1 if it is in Condition 3:
  - Grip the pistol grip firmly with the right hand. Pull the charging handle with the left hand to its rearmost position and release (see fig. 7-1).

Figure 7-1. Pulling Charging Handle with Left Hand.

  - Grip the handguards firmly with the left hand. Pull the charging handle with the right hand to its rearmost position and release (see fig. 7-2).

Figure 7-2. Pulling Charging Handle with Right Hand.

- As the rifle is being presented, take the rifle off safe and place the trigger finger on the trigger (see figs. 7-3a, 7-3b, and 7-3c on page 7-2).
- Level the rifle while pulling it firmly into the pocket of the shoulder to obtain proper stock weld. Do not move the head down to meet the stock of the rifle.

Note

If the rifle is in the shoulder properly, the aiming eye will be able to look through the rear sight as soon as the stock makes contact with the cheek.

- As the sights become level with the aiming eye, visually locate the target through the rear sight aperture. As the rifle sights settle, shift the focus back to the front sight post to obtain sight alignment, and place the tip of the post center mass on the target to obtain sight picture.

Presenting the Rifle From the Alert Carry and From the Ready Carry

The Marine uses the Alert Carry when enemy contact is likely. The Alert is also used for moving in close terrain (e.g., urban, jungle).

The Marine uses the Ready Carry when enemy contact is imminent.

Figures 7-3a, 7-3b, and 7-3c. Sweeping the Safety.

To present the rifle from the Alert and from the Ready, a Marine performs the following steps once a target appears:

- While looking at the target, bring the muzzle up by raising the left hand, allowing the rifle butt to pivot in the shoulder. At the same time, pull the rifle firmly into the pocket of the shoulder.
- As the rifle is being presented, take the rifle off safe and place the trigger finger on the trigger (see figs. 7-3a, 7-3b, and 7-3c).
- As the stock makes contact with the cheek, level the rifle to obtain proper stock weld.
- Do not move the head down to meet rifle stock.

Note

If the rifle is in the shoulder properly, the aiming eye will be able to look through the rear sight as soon as the stock makes contact with the cheek.

- As the sights become level with the aiming eye, visually locate the target through the rear sight aperture. As the rifle sights settle, shift the focus back to the front sight post to obtain sight alignment, and place the tip of the post center mass on the target to obtain sight picture.

Presenting the Rifle From the Strong Side Sling Arms Transport

Once a target appears, a Marine performs the following to present the rifle from Strong Side Sling Arms:

- While looking at the target, lean forward slightly to facilitate removal of the rifle from the shoulder.
- Reach under the right arm with the left hand between the sling and the body and grasp the handguards. See figure 7-4). At the same time, pull down on the sling and raise right elbow out and parallel to the deck.

Figure 7-4. Grasping the Handguards.

- Roll the right shoulder forward and release the sling from the right hand once the handguards have cleared the elbow. At the same time, pull rifle forward off the shoulder with left hand.
- Continue pulling the rifle forward with the left hand while rotating the rifle parallel to the deck; when the right arm is free of the sling and the rifle clears all personal gear, grasp the charging handle with the right hand (see fig. 7-5) and pull it to its rearmost position and release.
- Establish a firing grip with right hand while keeping the trigger finger straight along the receiver.
- Take rifle off safe and place the trigger finger on the trigger (see figs. 7-3a, 7-3b, and 7-3c).
- Level the rifle while pulling it firmly into the pocket of the shoulder to obtain proper stock weld. Do not move the head down to meet the stock of the rifle.

Figure 7-5. Clearing Gear and Grasping the Charging Handle.

Note

If the rifle is in the shoulder properly, the aiming eye will be able to look through the rear sight as soon as the stock makes contact with the cheek.

- As the sights become level with the aiming eye, visually locate the target through the rear sight aperture. As the rifle sights settle, shift the focus back to the front sight post to obtain sight alignment, and place the tip of the post center mass on the target to obtain sight picture.

Presenting the Rifle From the Weak Side Sling Arms Transport

The hasty sling should be maintained while presenting the rifle from this transport. To present the rifle from Weak Side Sling Arms, a Marine performs the following steps once a target appears:

- While looking at the target, lean forward slightly to facilitate removal of rifle from the shoulder.
- Grasp the sling with the right hand to prevent the rifle from falling off the shoulder.
- Grasp handguards with left hand (the index finger points toward the muzzle). See figure 7-6.
- Rotate the rifle counterclockwise while extending the muzzle toward the target.
- Continue extending the rifle toward the target to ensure the rifle clears all personal gear.
- Grasp the charging handle with the right hand and pull it to its rearmost position and release (see fig. 7-7).
- Establish a firing grip with right hand while keeping the trigger finger straight along the receiver.
- Take the rifle off safe and place the trigger finger on the trigger (see figures 7-3a, 7-3b, and 7-3c).
- Level the rifle while pulling it firmly into the pocket of the shoulder to obtain proper stock weld. Do not move the head down to meet the stock of the rifle.

Figure 7-6. Grasping the Handguards.

Note

If the rifle is in the shoulder properly, the aiming eye will be able to look through the rear sight as soon as the stock makes contact with the cheek.

Figure 7-7. Clearing Gear and Grasping the Charging Handle.

- As the sights become level with the aiming eye, visually locate the target through the rear sight aperture. As the rifle sights settle, shift the focus back to the front sight post to obtain sight alignment, and place the tip of the post center mass on the target to obtain sight picture.

7002. Search and Assess

After a Marine engages a target, he must immediately search the area and assess the results of his engagement. Searching and assessing enables the Marine to avoid tunnel vision that can restrict the focus so that an indication of other targets is overlooked.

Purpose

The Marine searches the area for additional targets or for cover. The Marine assesses the situation to determine if he needs to re-engage a target, engage a new target, take cover, assume a more stable position, cease engagement, etc.

Technique

To search and assess, a Marine performs the following steps:

- Keeping the buttstock in the shoulder, lower the muzzle of the rifle slightly to look over the sights.
- Place the trigger finger straight along the receiver (see fig. 7-8).
- Search the area and assess the situation/threat by moving the head, eyes, and rifle left and right (approximately 45 degrees from center) to cover the immediate area. The muzzle moves with the head and eyes in one fluid motion while searching. Keep both eyes open to increase the field of view.

Figure 7-8. Straight Trigger Finger.

- Once a Marine determines the area is clear of enemy threat, he places the rifle on safe.

Searching and Assessing to a Higher Profile

Depending on the tactical situation, the Marine may choose to increase his area of observation by searching and assessing to a higher profile position.

Prone to Kneeling

After searching and assessing at the prone position, move to a kneeling position by performing the following steps:

- While maintaining control of the pistol grip, lower the rifle butt out of the shoulder.
- Drop the left hand to the deck and, bringing it back, push up off the deck to both knees (see figs. 7-9a and 7-9b).
- Grasp the handguard with the left hand and place the rifle butt in the pocket of the shoulder.
- Assume a kneeling position and search and assess (see fig. 7-10).

Sitting to Kneeling

After searching and assessing at the sitting position, move to a kneeling position by performing the following steps:

- Maintain control of the rifle with the rifle butt in the pocket of the shoulder.

Figures 7-9a and 7-9b. Pushing Up Off the Deck to Both Knees.

- Uncross the legs to an open leg position.
- Tuck the right foot underneath the left thigh, as close to the buttocks as possible (see fig. 7-11).
- Lean forward and to the right and roll on to the right knee to a kneeling position and search and assess (see fig. 7-12).

Note

It may be necessary to release the rifle with the right hand and push off the deck with the right hand to assist in rolling up to a kneeling position.

Kneeling to Standing

After searching and assessing at the kneeling position, maintain control of the rifle with the rifle butt in the pocket of the shoulder, and stand while continuing to search and assess.

Figure 7-10. Kneeling Search and Assess.

Figure 7-11. Tucking the Right Foot.

Figure 7-12. Rolling Up to a Kneeling Position.

CHAPTER 8. EFFECTS OF WEATHER

Wind, temperature, and precipitation can affect the trajectory of the bullet. In addition, all weather conditions have a physical and psychological effect on Marines. Marines must use techniques to offset the effects of wind, light, temperature, and precipitation (snow, sleet, and rain). Through proper training, Marines can develop the confidence required to reduce the physical and psychological effects of weather during combat situations.

8001. Physical Effects of Wind on the Bullet

Physical Effects

The weather condition that presents the greatest problem to shooting is the wind. Wind affects a bullet's trajectory. The effect of wind on the bullet as it travels down range is referred to as deflection. The wind deflects the bullet laterally in its flight to the target (see fig. 8-1).

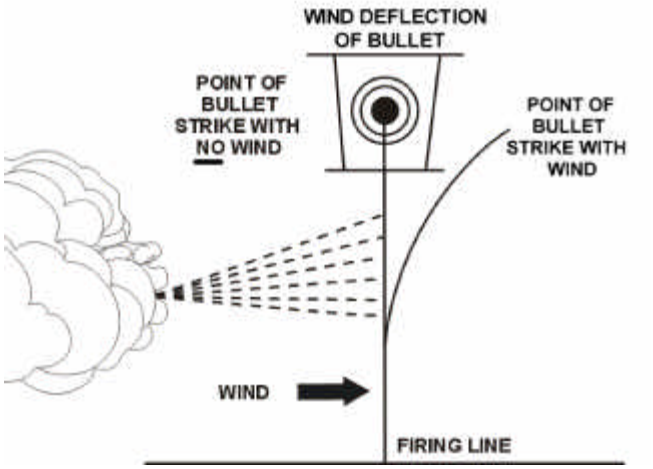


Figure 8-1. Deflection of a Bullet.

The bullet's exposure time to the wind determines the amount the bullet is deflected from its original trajectory. Deflection increases as the distance to the target increases. There are three factors that affect the amount of deflection of the bullet:

- Velocity of the wind—The greater the velocity of the wind, the more the bullet will be deflected.
- Range to the target—As the distance to the target increases, the speed of the bullet slows allowing the wind to have a greater effect on shot placement.
- Velocity of the bullet—A bullet with a high muzzle velocity will not be affected by the wind as much as a bullet with a low muzzle velocity.

Determining Windage Adjustments to Offset Wind Effects

The velocity and direction of the wind in relationship to the bullet must be determined to offset the wind's effects. If Marines can classify wind values and determine velocity within 5 mph, they can effectively engage targets in windy conditions.

Wind Direction

Determine wind direction by observing direction vegetation is moving, by feeling the wind blow against the body, or by observing direction of a flag (in training).

Wind Value Classifications

Winds are classified according to the direction from which they are blowing in relation to the direction of fire. The clock system indicates wind direction and value (see fig. 8-2). Winds can be classified as half

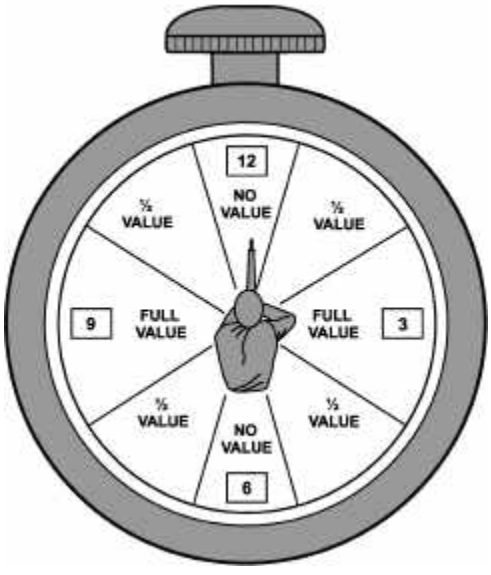


Figure 8-2. Clock System.

value, full value, or no value. The target is always located at 12 o'clock.

Wind Velocity

There are two methods used to determine wind velocity: observation and flag. The flag method is used as a training tool on the known distance (KD) range to learn the observation method. This method teaches Marines to relate the effect a given wind condition has on the natural surroundings in order to develop the base of knowledge used during the observation method. The observation method is the primary method used to estimate wind velocity and direction in a tactical situation. The following are guidelines used during the observation method:

- Under 3 miles per hour (mph) the wind can hardly be felt on the face. The presence of a slight wind can be detected by drifting smoke.
- 3 to 5 mph winds can be felt lightly on the face.
- 5 to 8 mph winds keep tree leaves in a constant motion.
- 8 to 12 mph winds raise dust and loose paper.
- 12 to 15 mph winds cause small trees to sway.
- 16 to 25 mph winds cause large trees to sway.

Flag Method

The flag method is primary method used on the KD range. To estimate wind velocity in miles per hour:

Estimate the angle created between the flagpole and the flag in degrees.

- Divide the angle by four to estimate wind velocity in miles per hour. See figure 8-3.

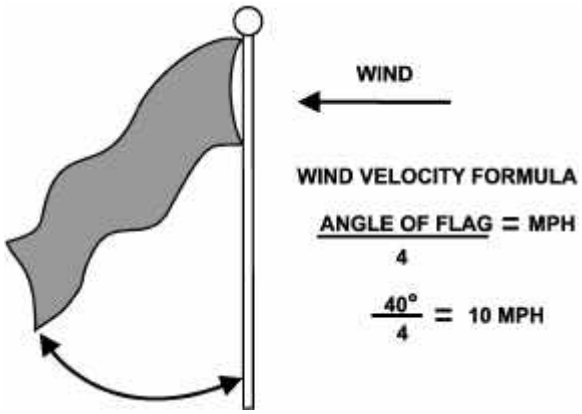


Figure 8-3. Flag Method.

Note

Information given is based on a dry flag. A wet flag is heavy and gives a false reading.

Windage Adjustments

After identifying wind direction, wind classification, and wind velocity, windage adjustments needed to enable the bullet to strike the target are estimated in the following ways:

Observation Method. Using the windage chart provided in figure 8-4, match the wind velocity, wind direction, and range to the target to the information in the chart to estimate the correct number of clicks to apply to the windage knob.

Flag Method. Using the windage chart provided in figure 8-5, match the wind velocity, wind direction, and range to the target to the information in the chart to determine the correct number of clicks to apply to the windage knob.

Once the number of windage clicks is determined, turn the windage knob causing the rear sight aperture to move into the direction of the wind. (See chapter 9.)

8002. Physical Effects of Temperature and Precipitation on the Bullet and the Rifle

Temperature

Extreme changes in temperature cause fluctuation in the rifle's chamber pressure. This fluctuation is caused by changes in the propellant's temperature. In cold weather, as rifle chamber pressure decreases, the bullet exits the muzzle at a lower velocity, and the bullet impacts the target below the point of aim. In extreme heat, the rifle's chamber pressure increases causing the bullet to exit the muzzle at a higher velocity and impact the target above the point of aim. Hot air is less dense than cool air and provides less resistance to the bullet; this allows the bullet to travel faster and experience less deflection from the wind. Cold air is dense and provides the bullet with more resistance; this causes the bullet to travel slower and experience greater deflection from the wind.

	WINDS CAN BE FELT LIGHTLY ON FACE AND LEAVES ARE IN CONSTANT MOTION		WINDS RAISE DUST AND LOOSE PAPER 8-12 MPH		WINDS CAUSE SMALL TREE TO SWAY 12-15 MPH		WINDS CAUSE LARGE TREES TO SWAY 16-20 MPH		21-25 MPH	
RANGE YARDS	WIND VALUE		WIND VALUE		WIND VALUE		WIND VALUE		WIND VALUE	
	FULL	HALF	FULL	HALF	FULL	HALF	FULL	HALF	FULL	HALF
200	2	1	3	1	5	2	6	3	8	4
300	3	1	6	3	10	5	13	6	16	8
400	4	2	9	4	13	6	18	9	22	11
500	6	3	12	6	18	9	24	12	30	15

Figure 8-4. Windage Click Chart for the Observation Method.

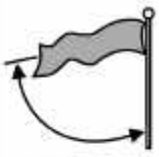
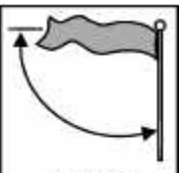
RANGE FLAG ANGLES	5 MPH		10 MPH		15 MPH		 20 MPH		 25 MPH	
RANGE YARDS	WIND VALUE		WIND VALUE		WIND VALUE		WIND VALUE		WIND VALUE	
	FULL	HALF	FULL	HALF	FULL	HALF	FULL	HALF	FULL	HALF
200	2	1	3	1	5	2	6	3	8	4
300	3	1	6	3	10	5	13	6	16	8
400	4	2	9	4	13	6	18	9	22	11
500	6	3	12	6	18	9	24	12	30	15

Figure 8-5. Windage Click Chart for the Flag Method.

Once the rifle is zeroed, a change in temperature of 20 degrees or more can cause the bullet to strike above or below the point of aim. Therefore, if the temperature changes 20 degrees or more, a Marine should re-zero the rifle.

If the rifle is exposed to below freezing temperatures, it should not be brought immediately into a warm location. Condensation may form on and in the rifle, and it may freeze if re-exposed to the cold. Ice that forms inside the rifle may cause it to malfunction. Ice can form on the rear sight aperture due to condensation, making it impossible to acquire sight alignment.

Precipitation

Freezing rain and other types of precipitation may make the rifle difficult to handle, foul the rifle and cause stoppages, or build up in the barrel or compensator and cause erratic shots. Care should be taken to keep the barrel and muzzle free of water. If the rifle has been submerged, ensure the bore is drained before firing. To drain the bore, pull the charging handle slightly to the rear and hold for a few seconds while the muzzle points down. Once the barrel has been drained, turn the rifle muzzle up to allow the water to drain out of the stock.

8003. Physical and Psychological Effects of Weather on Marines

Wind

Marines can shoot effectively in windy conditions if they apply a few basic techniques and develop the proper mental attitude. The Marine can combat the wind in a number of ways:

- Make subtle changes to the basic shooting positions, such as increasing muscular tension, to reduce movement of the rifle sights.
- Select a more stable firing position.
- Seek support to stabilize the rifle.
- Hold the shot and apply the fundamentals during a lull in the wind.

Temperature

Extreme Heat

In extreme heat, a Marine may experience rapid fatigue. Heat can cause muscle cramps, heat exhaustion, heat stroke, blurred vision, and reduced concentration levels that result in inaccurate shooting. Increased fluid intake and good physical condition can offset the effects of extreme heat. Sweat running into the eyes can cause irritation and make it difficult to see the sights. Extreme heat also can create ground mirages that cause a target to appear indistinct and to drift from side to side. Heat waves or mirages may also distort the target shape or the appearance of the front sight post. A mirage created by the heat of the barrel reduces a Marine's ability to see the sight clearly. To overcome the effects of heat and accurately engage a target, a Marine should maintain a center of mass hold.

Extreme Cold

Extreme cold may affect a Marine’s ability to concentrate. If a Marine’s hands are numb, he will have difficulty holding a frigid rifle and executing effective trigger control. To protect the hands in a cold environment, a Marine should wear arctic mittens or gloves. To operate the rifle while wearing arctic mittens or gloves, a Marine depresses the trigger guard plunger to open the trigger guard. This allows easier access to the trigger. See figure 8-6. The hasty sling can assist in holding the hand in place on the hand guards so the hand does not slip while wearing mittens.

Precipitation

Precipitation (rain, snow, hail, sleet) can affect target engagement, a Marine’s comfort level, and a Marine’s ability to concentrate. The amount and type of precipitation may obscure or completely hide the target and it may reduce a Marine's ability to establish an accurate sight picture. Precipitation collecting on rear sight aperture can make it difficult to establish sight alignment and sight picture. Protect sights as much as possible

Figure 8-6. Open Trigger Guard.

during periods of precipitation. It is easy to lose concentration when wet and uncomfortable. Proper dress reduces the effects of precipitation on the Marine.

Light

Light conditions can change the appearance of a target. Light affects each Marine differently. Light can affect range estimation, visual acuity, or the placement of the tip of the front sight on the target. By maintaining a center of mass hold, the effects of light can be reduced.

Bright Light

Bright light conditions exist under a clear blue sky with no fog or haze present to filter the sunlight. Bright light can make a target appear smaller and farther away. As a result, it is easy to overestimate range. Maintaining a center of mass hold, regardless of how indistinct the target appears, ensures the best chances for an effective shot.

Overcast

An overcast condition exists when a solid layer of clouds blocks the sun. The amount of available light changes as the overcast thickens. Overcast conditions can make a target appear larger and closer. As a result, it is easy to underestimate range. During a light overcast, the target appears very distinct and the rifle sights appear very distinct, making it easy to establish sight alignment. As the overcast thickens, it becomes difficult to identify the target from its surroundings.

Haze

Hazy conditions exist when fog, dust, humidity or smoke is present. Hazy conditions can make a target appear indistinct making it difficult to establish sight picture.

CHAPTER 9. ZEROING

To be combat effective, it is essential for the Marine to know how to zero his rifle. Zeroing is adjusting the sights on the weapon to cause the shots to impact where the Marine aims. This must be done while compensating for the effects of weather and the range to the target. It is critical that Marines can zero their rifles and make the sight adjustments required to engage targets accurately.

See the appropriate technical manual for procedures on boresighting and zeroing with supplemental aiming devices (e.g., laser, night vision devices).

Note

+ The procedures in this manual are written for right-handed Marines; left-handed Marines should reverse instructions as necessary.

9001. Elements of Zeroing

There are five basic elements involved in zeroing a rifle: line of sight, aiming point, centerline of the bore, trajectory, and range. See figure 9-1.

Line of Sight

The line of sight is a straight line, which begins with the shooter's eye, proceeds through the center of the rear sight aperture, and passes across the tip of the front sight post to a point of aim on a target.

Aiming Point

The aiming point is the precise point where the tip of the front sight post is placed in relationship to target.

Centerline of the Bore

Centerline of the bore is an imaginary straight-line beginning at the chamber end of the barrel, proceeding out of the muzzle, and continuing indefinitely.

Trajectory

In flight, a bullet does not follow a straight line but travels in a curve or arc, called trajectory. Trajectory is the path a bullet travels to the target. As the bullet exits the muzzle, it travels on an upward path, intersecting the line of sight (because the sights are above the muzzle). As the bullet travels farther, it begins to drop and intersects the line of sight again.

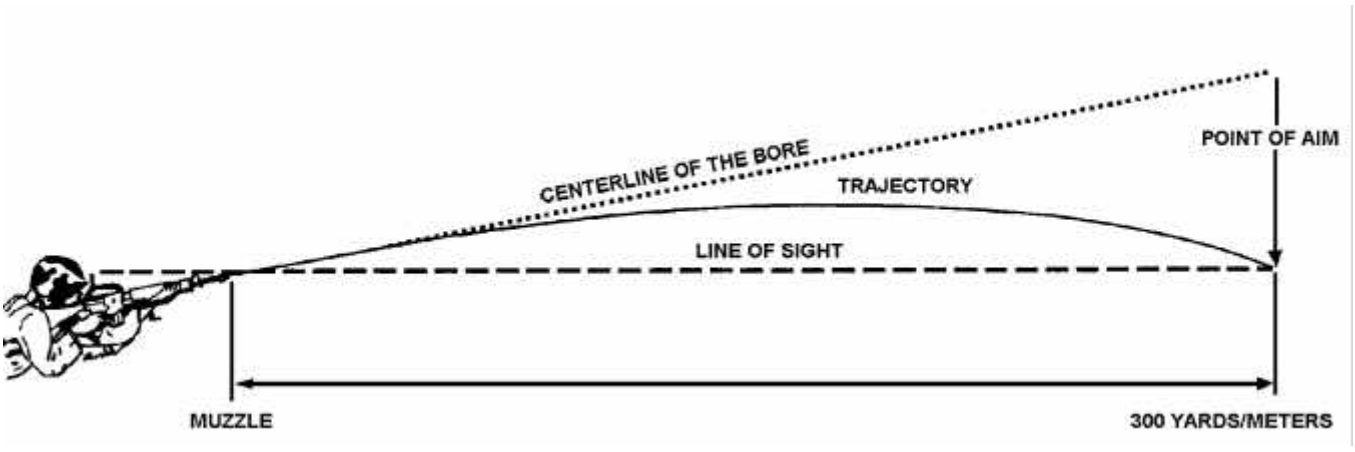


Figure 9-1. Elements of Zeroing.

Range

Range is the KD from the rifle muzzle to the target.

9002. Types of Zeros

Battlesight Zero (BZO)

A BZO is the elevation and windage settings required to place a single shot, or the center of a shot group, in a predesignated location on a target at 300 yards/meters, under ideal weather conditions (i.e., no wind). A BZO is the sight settings placed on your rifle for combat. In combat, your rifle's BZO setting will enable engagement of point targets from 0–300 yards/meters in a no-wind condition.

Zero

A zero is the elevation and windage settings required to place a single shot, or the center of a shot group, in a predesignated location on a target at a specific range, from a specific firing position, under specific weather conditions.

True Zero

A true zero is the elevation and windage settings required to place a single shot, or the center of a shot group, in a predesignated location on a target at a specific range other than 300 yards/meters, from a specific firing position, under ideal weather conditions (i.e., no wind).

9003. M16A2 Sighting System

The sighting system of the M16A2 service rifle consists of a front sight post and two rear sight apertures windage and elevation knob. Scales of the sighting system may be applied accurately to both yard and meter measurements. For example, a rear sight elevation setting of 8/3 may be used for 300 yards/meters.

Front Sight

The front sight post is used to adjust for elevation. The front sight consists of a square, rotating sight post with a four-position, spring-loaded detent (see fig. 9-2). To adjust for elevation, use a pointed instrument (or the tip of a cartridge) to depress the detent and rotate the front sight post (see fig. 9-3). To raise the strike of the bullet, rotate the post clockwise (in the direction of the arrow marked UP) or to the right. To lower the strike of the bullet, rotate the post counter-clockwise (in the opposite direction of the arrow) or to the left.

Figure 9-2. Front Sight.

Figure 9-3. Front Sight Adjustment.

Rear Sight

The rear sight consists of two sight apertures, a windage knob, and an elevation knob. See figure 9-4. The large aperture marked 0-2 is used for target engagement during limited visibility, when a greater field of view is desired, or for engagements of targets closer than 200 yards/meters. The unmarked aperture (small aperture) is used for zeroing and normal firing situations.

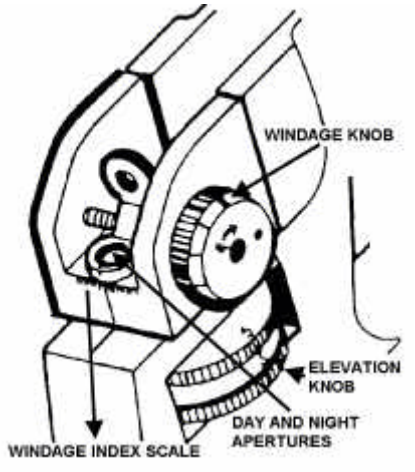


Figure 9-4. Rear Sight.

Elevation Knob

The rear sight elevation knob is used to adjust the sight for a specific range to the target. The elevation knob is indexed as shown in figure 9-5. Each number on the knob represents a distance from the target in 100-yard/meter increments. To adjust for range to the target, rotate the elevation knob so the desired setting is aligned with the index on the left side of the receiver.

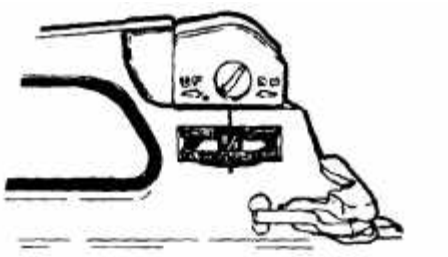


Figure 9-5. Elevation Knob.

If the elevation knob is turned so the number 8/3 aligns with the elevation index line, the 3 indicates 300 yards/meters (see fig. 9-6).

Figure 9-6. Rear Sight Elevation Knob Set for 300 Yards/Meters.

When the rear sight elevation knob is set on 8/3 for 800 yards/meters, there will be a considerable gap (about a quarter inch) between the rear sight housing and the upper receiver (see fig. 9-7).

Figure 9-7. Rear Sight Elevation Knob Set for 800 Yards/Meters.

A hasty sight setting is the setting placed on the rear sight elevation knob to engage targets beyond 300 yards/meters. Hasty sight settings for ranges of 400 to 800 yards/meters are applied by rotating the rear sight elevation knob to the number that corresponds with the engagement distance of the enemy. Aligning the number 4, 5, 6 or 7 with the elevation index line places the elevation at 400, 500, 600 or 700 yards/meters, respectively. If a clockwise rotation is continued, the number 8/3 appears for the second time on the elevation index line and indicates an 800 yard/meter elevation.

Windage Knob

The windage knob is used to adjust the strike of the round right or left. The windage knob is marked with an arrow and the letter R that shows the direction the strike of the round is being moved. See figure 9-8.

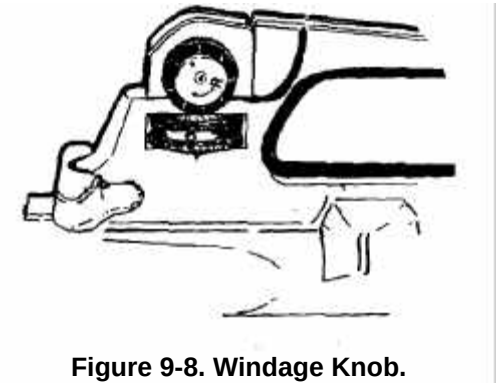


Figure 9-8. Windage Knob.

To move the strike of the round to the right, rotate the windage knob clockwise (in the direction of the arrow marked R).

To move the strike of the round to the left, rotate the windage knob counterclockwise.

9004. Windage and Elevation Rules

Moving the front sight post, elevation knob or windage knob one graduation or notch is referred to as moving one “click” on the sight. The windage and elevation rules define how far the strike of the round will move on the target for each click of front and rear sight elevation or rear sight windage for each 100 yards/meters of range to the target.

Front Sight Elevation Rule

One click of front sight elevation adjustment will move the strike of the round on target approximately 1.25 inches for every 100 yards of range to the target or 3.5 centimeters for every 100 meters of range to the target.

Rear Sight Elevation Rule

One click of rear sight elevation adjustment will move the strike of the round on the target approximately 1 inch for every 100 yards of range to the target or 2.5 centimeters for every 100 meters of range to the target.

Windage Rule

One click of windage adjustment will move the strike of the round on the target approximately 0.5 inch for every 100 yards of range to the target or 1.25 centimeters for every 100 meters of range to the target.

9005. Initial Sight Settings

Initial sight settings are those settings that serve as the starting point for initial zeroing from which all sight adjustments are made. (If the Marine already has a BZO established on his rifle, he may begin the zeroing process by using the previously established BZO sight settings.) To set the sights to initial sight settings:

Front Sight Post

To set the front sight post to initial sight setting, depress the front sight detent and rotate the front sight post until the base of the front sight post is flush with the front sight housing.

Rear Sight Elevation Knob

To set the elevation knob at the initial sight setting, perform the following:

- Rotate the rear sight elevation knob counterclockwise until the moveable rear sight housing is bottomed out on the upper receiver. See figure 9-9.

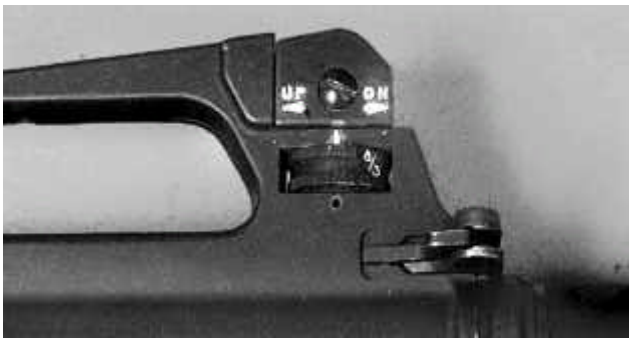


Figure 9-9. Bottoming Out Elevation Knob.

Note

Once bottomed out, the rear sight elevation knob should be three clicks counterclockwise from 8/3. If the sight fails to move three clicks counterclockwise from 8/3, it must be adjusted by a qualified armorer.

- Rotate rear sight elevation knob clockwise until the number 8/3 aligns with the index mark located on the left side of the upper receiver. See figure 9-10.

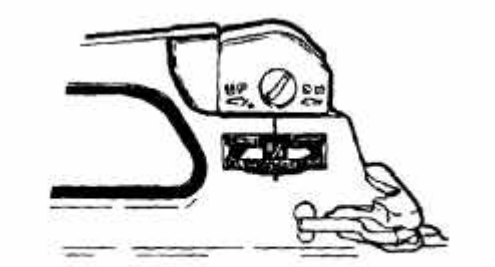


Figure 9-10. Elevation Knob Set at 8/3.

Windage Knob

To set the windage knob to initial sight setting, rotate windage knob until the index line located on the top of the large rear sight aperture aligns with the centering on the windage index scale located on the moveable base of the rear sight assembly. See figure 9-11.

Figure 9-11. Aligning Index Line.

9006. Zeroing Process

During the zeroing process, all elevation adjustments are made on the front sight post. Once a BZO is established, the front sight post should never be moved, except when rezeroing the rifle. (The rear sight elevation knob is used for dialing in the range to

the target.) Zeroing is conducted at a range of 300 yards/meters. To prepare a rifle for zeroing, the rifle sights must be adjusted to the initial sight settings as outlined in paragraph 9005. Perform the following steps to zero the rifle:

- Fire a 3-shot group.
- Triangulate the shot group to find the center. See figure 9-12.
- Determine the vertical distance in inches from the center of the shot group to the center of the target.
- Make elevation adjustments on the front sight post to move the center of the shot group to the center of the target.
- Determine the horizontal distance from the center of the shot group to the center of the target.
- Make lateral adjustments on the windage knob to move the center of the shot group to the center of the target.
- Repeat preceding steps until shot group is centered.
- Fire a 4-round shot group to confirm sight setting.

Once the sight setting is confirmed, determine the value and direction of the wind and remove the number of clicks added to the windage knob (if necessary) to compensate for current wind conditions. This becomes the BZO setting for the rifle.

9007. Battlesight Zero

Zeroing is conducted at a range of 300 yards/meters. If a 300-yard/-meter range is not available, a field expedient BZO can be established at a reduced range of 36 yards/30 meters. When a rifle is zeroed for 300 yards/meters, the bullet crosses the line of sight twice. It first

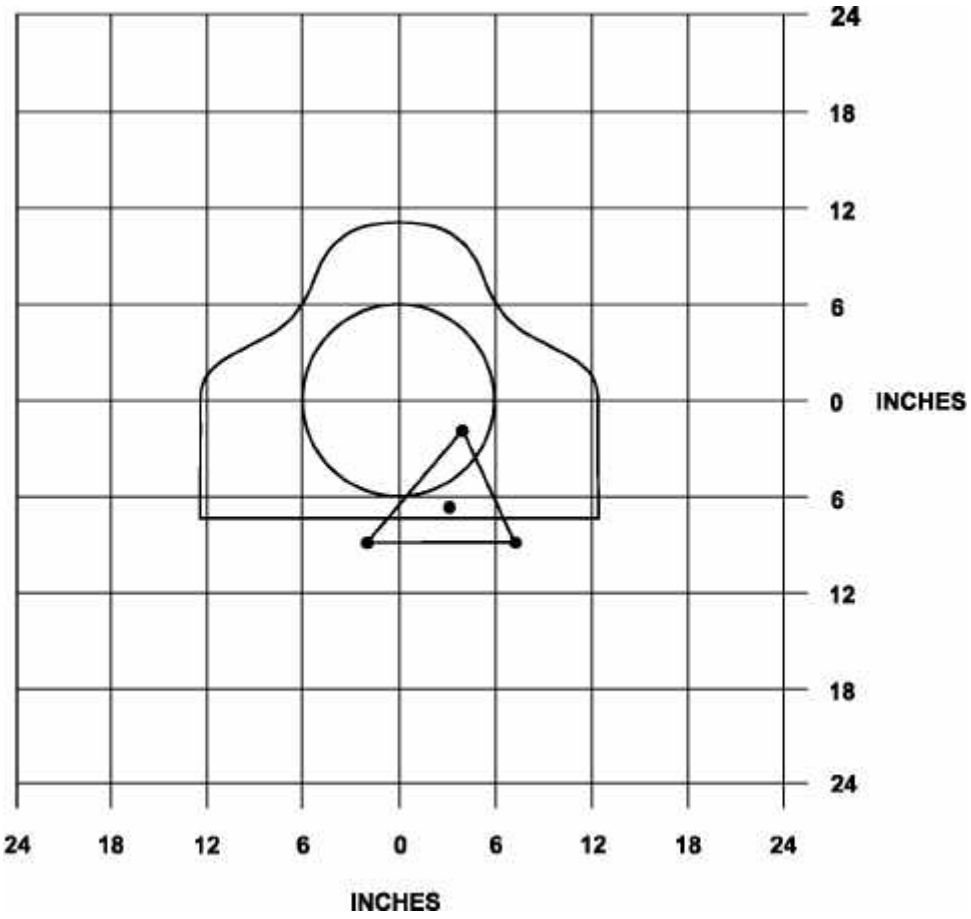


Figure 9-12. Triangulating Shot Group.

crosses the line of sight on its upward path of trajectory at 36 yards/30 meters, and again farther down range at 300 yards/meters (see fig. 9-13). Therefore a rifle's BZO may be established at a distance of 36 yards/30 meters and the same BZO will be effective at 300 yards/meters.

To establish a field expedient BZO at 36 yards or 30 meters when a 300-yard/-meter range is not available, a Marine performs the same steps as the zeroing process outlined in paragraph 9006. However, since wind does not affect the round at 36 yards/30 meters, windage is not added nor is it removed from the windage knob after confirming the BZO. To be accurate, the target must be placed exactly 36 yards (or 30 meters) from the muzzle of the rifle.

9008. Factors Causing a BZO to be Reconfirmed

Marines are responsible for maintaining a BZO on their rifles at all times. Many factors influence the BZO of a rifle. Atmospheric conditions, humidity, and temperature can cause BZOs to change on a daily basis. If operating in a combat environment, Marines should confirm their BZO as often as possible. To confirm a BZO, a Marine may begin the zeroing process by using the previously established BZO sight settings rather than placing the sights at initial sight setting. The following factors cause a BZO to be reconfirmed.

Maintenance

It is possible for the BZO to change if ordnance personnel perform maintenance on a rifle. If maintenance was performed, it is critical that the rifle be rezeroed as soon as possible.

Temperature

An extreme change in temperature (i.e., 20 degrees or more) will cause the elevation BZO to change. Changes in temperature cause chamber pressure to increase when hot and decrease when cold. This causes shots to impact the target high in hot temperatures and low in cold temperatures.

Climate

Changing climates (i.e., moving from a dry climate to a tropical climate) can mean changes in air density, moisture content, temperature or barometric pressure. Any of these elements can affect the rifle's BZO.

Ammunition

Inconsistencies in the production of ammunition lots can change a rifle's BZO.

Ground Elevation

Drastic changes in ground elevation can create changes in air density, moisture content, temperature or barometric pressure. Any of these elements can affect the rifle's BZO.

Uniform

If Marines zero their rifles in utility uniform and fire in full battle gear, their BZOs will change. The wearing of full battle gear changes eye relief, placement of the rifle in the shoulder pocket, and the way the rifle is supported on the handguard. Marines must establish their BZOs while wearing the uniform and equipment they will be wearing while engaging targets.

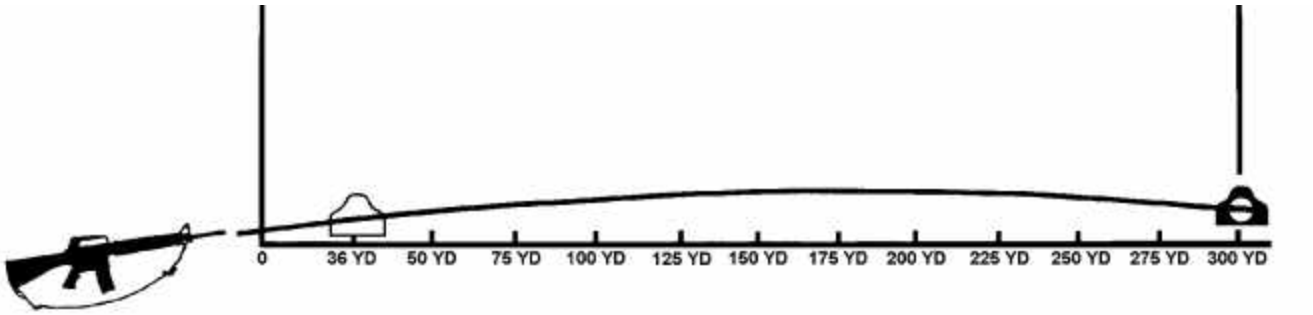


Figure 9-13. Bullet Crossing the Line of Sight Twice.

9009. Factors Affecting the Accuracy of a BZO

Anything the Marine changes from shot to shot affects the accuracy of his BZO. It further affects the accuracy of shot placement. The following factors, when applied inconsistently, diminish the accuracy of a BZO:

- Any of the seven factors (left hand, rifle butt in the pocket of the shoulder, grip of the right hand, right elbow, stock weld, breathing, and muscular relaxation/tension).
- Stability of hold.
- Sling tension.
- Trigger control.
- Sight picture.

CHAPTER 10. ENGAGEMENT TECHNIQUES

A Marine must maintain the ability to react instinctively in a combat environment—day or night. He must possess a combat mindset that eliminates hesitation, fear, or uncertainty of action. A Marine's combat mindset allows him to engage the enemy rapidly and focus on the actions required to fire well-aimed shots. He must remember that speed alone does not equate to effective target engagement. He should fire only as fast as he can fire accurately. He should never exceed his physical capability to engage a target effectively. To be effective in combat, a Marine must train to perfect the physical skills of target engagement (such as presenting the weapon and assuming a shooting position) until they become instinctive. A Marine must also employ effective engagement techniques that enable acquisition and engagement of a variety of targets in diverse combat conditions.

10001. Target Detection

To be proficient, a Marine rifleman must be able to detect targets, determine the range to targets, and accurately engage the targets. There are many variables affecting a Marine's ability to detect and determine the range to combat targets. Enemy targets on the battlefield may be single or multiple, stationary or moving, or completely hidden from view. Success in locating an enemy target will depend upon the observer's position, his skill in searching an area, and his ability to recognize target indicators.

Target Indicators

Most combat targets are detected at close range by smoke, flash, dust, noise or movement, and are usually seen only momentarily. Target indicators are anything that reveals an individual's position to the enemy. These indicators are grouped into three general areas: movement, sound, and improper camouflage.

Movement

The human eye is attracted to movement, especially sudden movement. The Marine need not be looking directly at an object to notice movement. The degree of difficulty in locating moving targets depends primarily on the speed of movement. A slowly moving target will be harder to detect than one with quick, jerky movements.

Sound

Sound can also be used to detect an enemy position. Sound may be made by movement, rattling equipment, or talking. Sound provides only a general location of the enemy, making it difficult to pinpoint a target by sound alone. However, sound can alert the Marine to the presence of a target and increase his probability of locating it through other indicators.

Improper Camouflage

There are three indicators caused by improper camouflage: shine, outline, and contrast with the background. Most targets on the battlefield are detected due to improper camouflage. However, many times an observation post or enemy firing position will blend almost perfectly with the natural background. Only through extremely careful, detailed searching will these positions be revealed.

Shine. Shine is created from reflective objects such as metal or glass. It may also come from pools of water and even the natural oils from the skin. Shine acts as a beacon to the target's position.

Outline. Most enemy soldiers will camouflage themselves, their equipment, and their positions. The outline of objects such as the body, head and shoulders, weapons, and web gear are recognizable even from a distance. The human eye will often pick up a recognizable shape and concentrate on it even if the object cannot be identified immediately. The reliability of this indicator depends upon visibility and the experience of the observer.

Contrast With the Background. Indicators in this category include objects that stand out against (contrast with) a background because of differences in color, surface, and shape. For instance, a target wearing a dark uniform would be clearly visible in an area of snow or sand. Geometric shapes, such as helmets or rifle barrels, can be easy to detect in a wooded area. Fresh soil around a fighting hole contrasts with the otherwise unbroken ground surface. While observing

an area, take note of anything that looks out of place or unusual and study it in more detail. This will greatly increase your chances of spotting a hidden enemy.

Identifying Target Location

Observation Position

A good position is one that offers maximum visibility of the area while affording cover and concealment. The optimal observation position should allow the Marine to scan all the areas of observation and offer enough concealment to prevent his position from being detected.

The Marine should avoid positions that are obvious or stand out, such as a lone tree in a field or a pile of rocks on a hill. These positions may be ideal points for easy observation, but they will also make it easier for the enemy to locate the Marine.

Methods for Searching an Area

In searching an area, the Marine will be looking for target indicators. There are two techniques for searching an area: the hasty search and the detailed search.

Hasty Search. When a Marine moves into a new area, he must quickly check for enemy activity that may pose an immediate danger. This search is known as the hasty search and should take about 30 seconds, depending on the terrain.

Quickly glance at various points throughout the area rather than sweeping the eyes across the terrain in one continuous movement. The Marine should search the area nearest him first since it poses the greatest potential for danger.

This method of search is effective because it takes advantage of peripheral vision. Peripheral vision enables the detection of any movement in a wide area around the object being observed. For this technique to be effective, the eyes must be focused briefly on specific points (i.e., areas that may provide cover or concealment for the enemy).

Detailed Search. A detailed search is a systematic examination of a specific target indicator or of the entire observation area. A detailed search should be conducted immediately on target indicators located during the hasty search. The detailed search should be made from top to bottom or side to side, observing the entire object in exact detail. If multiple indicators were observed during the hasty search, the detailed search should begin with the indicator that appears to pose the greatest threat.

After a thorough search of target indicators, or if no indicators were located during the hasty search, a detailed search should be made of the entire observation area. The 50-meter overlapping strip method is normally used.

Normally, the area nearest the observer offers the greatest potential danger and should be searched first. Begin the search at one flank, systematically searching the terrain at the front in 180-degree arcs, searching everything in exacting detail, 50 meters in depth. See figure 10-1.

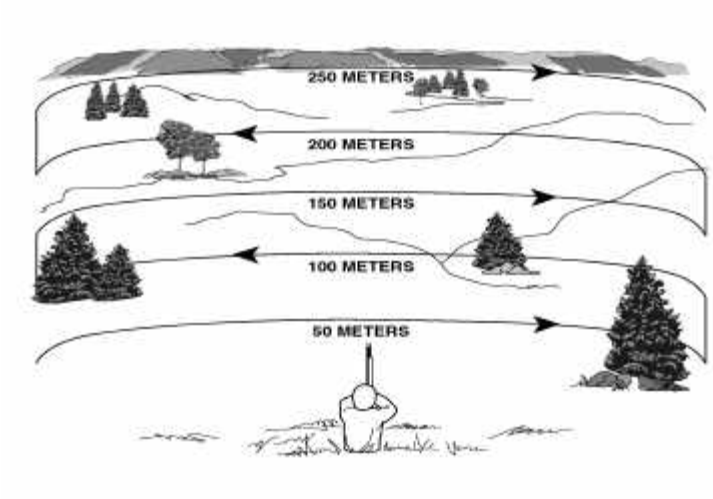


Figure 10-1. Searching the Terrain in Overlapping Strips.

After reaching the opposite flank, systematically cover the area between 40 and 90 meters from your position. The second search of the terrain includes about 10 meters of the area examined during the first search. This technique ensures complete coverage of the area.

Continue the overlapping strip search method for as far as you can see.

Maintaining Observation

Method

The combat situation will dictate the method of maintaining observation of an area. Generally, the observation method will include a combination of hasty and detailed searches.

Sequence of Observation

Observation is often conducted by a two-man team. One team member should constantly observe the entire area using the hasty search technique and the other team member should conduct a detailed overlapping strip search. If you are observing as an individual, devise a plan to ensure that the area of observation is completely covered. When entering a new area, immediately conduct a hasty search. Since a hasty search may fail to detect some indicators, periodically conduct a detailed search of the area. A detailed search should also be conducted any time your attention has been diverted from the search area.

Remembering Target Location

Most targets are seen only briefly and most areas contain multiple targets. Once you have located a target indicator, you will need to remember its location to engage it successfully. To help remember the location of a target, select a known feature and use it as a reference point to determine the distance and general direction to the target.

10002. Range Estimation

To engage targets at unknown distances, a Marine must determine the distance from his location to a known point. This is known as range estimation. The ability to determine range is a skill that must be developed if a Marine is to successfully engage targets at unknown distances. Precise range estimation enhances accuracy, enhances the chance of survival, and determines if a target can be effectively engaged using the rifle's existing BZO or if a new sight setting or point of aim is required.

Range Estimation Methods

Unit of Measure Method

To use this method, a Marine visualizes a distance of 100 meters on the ground, and then estimates how many of these units will fit between him and the target. This determines the total distance to the target. See figure 10-2.

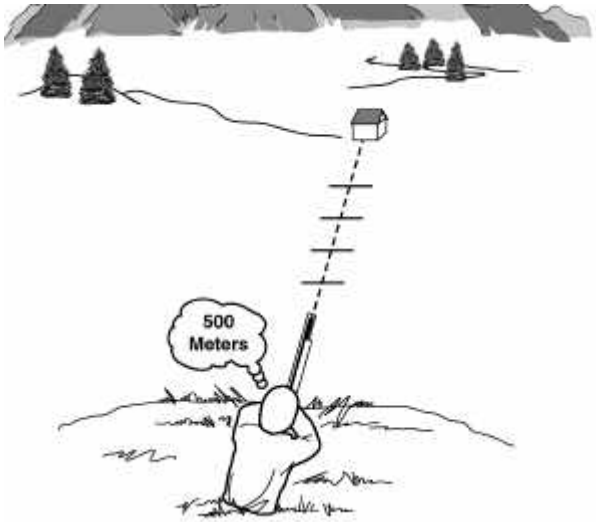


Figure 10-2. Unit of Measure Method.

The greatest limitation of this method is that its accuracy is related to the amount of visible terrain. For example, if a target appears at a range of 500 meters or more and only a portion of the ground between a Marine and the target can be seen, it becomes difficult to use the unit of measure method to estimate range accurately. A Marine must practice this method frequently to be proficient. Whenever possible, a Marine should select an object, estimate the range, and then verify the actual range by either pacing or using another accurate measurement.

Rifle Front Sight Post Method

The area of the target covered by the rifle's front sight post can be used to estimate range to a target. A Marine notes the appearance of the front sight post on a known-distance target. A Marine then uses this as a guide to determine range over an unknown distance. Because the apparent size of the target changes as the distance to the target changes, the amount of the target covered by the front sight post varies based on the

range. In addition, a Marine's eye relief and perception of the front sight post affect the amount of the target that is visible. To use this method, a Marine must apply the following guidelines:

- The front sight post covers the width of a man's chest or body at approximately 300 meters.
- If the target is less than the width of the front sight post, the target is in excess of 300 meters and the rifle's BZO cannot be used effectively.
- If the target is wider than the front sight post, the target is less than 300 meters and can be engaged point of aim/point of impact using the rifle's BZO.

See figure 10-3.

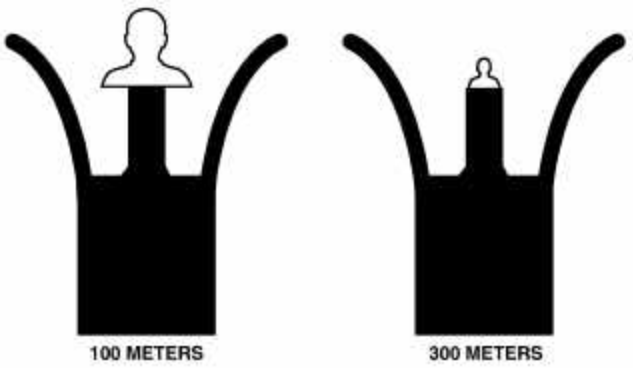


Figure 10-3. Front Sight Post Method.

Visible Detail Method

The amount of detail seen at various ranges can provide a Marine with an estimate of the target's distance. To use this method, a Marine must be familiar with the size and various details of personnel and equipment at known distances. Visibility (such as weather, smoke or darkness) limits the effectiveness of this method. A Marine should observe a man while he is standing, kneeling, and in the prone position at known ranges of 100 to 500 meters. He should note the man's size, characteristics/size of his uniform and equipment, and any other pertinent details. The Marine then uses this as a guide to determine range over an unknown distance. A Marine also should study the appearance of other familiar objects such as rifles and vehicles. To use this method, a Marine applies the following general guidelines:

- At 100 meters, the target is clearly observed in detail and facial features are distinguished
- At 200 meters, the target is clearly observed. There is a loss of facial detail. The color of the skin and equipment are still identifiable.
- At 300 meters, the target has a clear body outline, face color usually remains accurate, but remaining details are blurred.
- At 400 meters, the body outline is clear, but remaining detail is blurred.
- At 500 meters, the body shape begins to taper at the ends, and the head becomes indistinct from the shoulders.
- At 600 meters, the body appears wedge-shaped and headless.

Bracketing Method

This method of range estimation estimates the shortest possible distance and the greatest possible distance to the target. For example, a Marine estimates that a target may be as close as 300 meters but it could be as far away as 500 meters. The estimated distances are averaged to determine the estimated range to the target. For example, the average of 300 meters and 500 meters is 400 meters.

Halving Method

To use the halving method, a Marine estimates the distance halfway between him and the target, then doubles that distance to get the total distance to the target. A Marine must take care when judging the distance to the halfway point; any error made in judging the halfway distance is doubled when estimating the total distance.

Combination Method

The methods previously discussed require optimal conditions with regard to the target, terrain, and visibility in order to obtain an accurate range estimation. A Marine should estimate the range using two methods and then compare the estimates, or two Marines can compare their estimates. The average of the two estimates should be close to the actual range to target.

Factors Affecting Range Estimation

The following specific factors will affect the accuracy of estimation. A Marine must be aware of these factors and attempt to compensate for their effects.

Nature of the Target

- An object with a regular outline such as a steel helmet, rifle, or vehicle on a clear day will appear to be closer than one with an irregular outline such as a camouflaged object.

- A target that contrasts with its background will appear to be closer than a target that blends in with its background.
- A partially exposed object will appear to be farther away than it is.
- A target will appear to be farther away if the target is smaller than the objects surrounding it.

Nature of the Terrain

- Terrain that slopes upward gives the illusion of shorter distance.
- Terrain that slopes downward gives the illusion of greater distance.
- Terrain with dead space makes the target appear to be closer.
- Smooth terrain such as sand, water, or snow gives the illusion of greater distance.

Limited Visibility

The position of the light source significantly affects a Marine's ability to estimate range. Other factors that affect range estimation include smoke, fog, rain, angled light, or anything that obscures the battlefield. Generally, when the sun is bright, a target appears further away. When the sky is overcast, a target generally appears closer. Target contrast is another factor to consider when estimating range as well as obstacles located between the shooter and the target. If there is contrast (e.g., color variation) between the target and the background, the target will appear closer. If there is little or no contrast between the target and the background, the target will appear farther away. If there is an object between the target and the shooter that will distract the shooter (e.g., a tree), the target will appear farther away.

10003. Offset Aiming

The conditions of rifle fire in combat may not permit mechanical adjustments of the sights. To engage a target during combat, a Marine may be required to aim his rifle at a point on the target other than center mass. This is known as offset aiming. Offset aiming is used to compensate for the distance and size of the target, wind, and speed and angle of a moving target. There are two primary techniques for offset aiming: point of aim technique and known strike of the round.

Point of Aim Technique

The point of aim technique is the shifting of the point of aim (sight picture) to a predetermined location on or off the target to compensate for a known condition (i.e., wind, distance, and movement). Each predetermined location is known as a point of aim. Figure 10-4 illustrates points of aim for elevation.

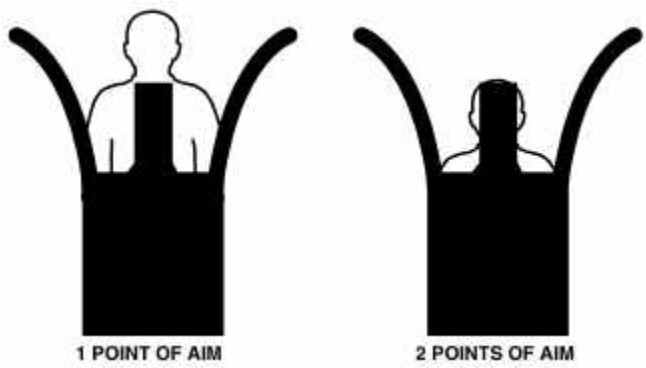


Figure 10-4. Points of Aim for Elevation.

Elevation

Predetermined points of aim sector the target horizontally. The tip of the front sight post held at shoulder level is considered one point of aim; the tip of the front sight post held at the top of the target's head is considered two points of aim. A Marine uses these points of aim to compensate for the elevation required to engage a target beyond the BZO capability of the rifle or to engage a small target (e.g., head shot) inside the BZO of the weapon.

Beyond the BZO. To use the point of aim technique to engage a target beyond the BZO of the rifle, a Marine must apply the following guidelines:

- When range to the target is estimated to be beyond 300 meters out to 400 meters, hold one point of aim.
- When the range to the target is estimated to be beyond 400 meters out to 500 meters, hold two points of aim.

Note

It is better to apply a hasty sight setting at ranges beyond the rifle's BZO. Points of aim are only guidelines at these distances because the front sight will mask the target when the front sight is held above center mass, making it difficult to acquire sight picture.

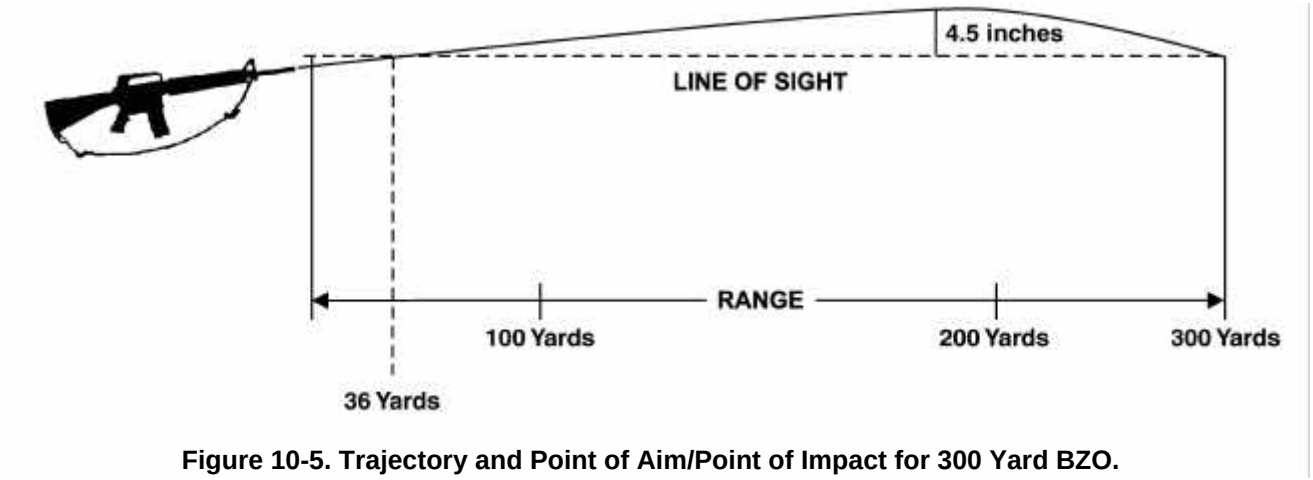


Figure 10-5. Trajectory and Point of Aim/Point of Impact for 300 Yard BZO.

Inside the BZO. If the rifle is properly zeroed for 300 yards/meters, the trajectory (path of the bullet) will rise approximately 4.5 inches (11 centimeters) above the line of sight at a distance of approximately 175 yards (160 meters). At other distances, the strike of the bullet will be less than 4.5 inches above the point of aim. Only at 36 yards/30 meters and 300 yards/meters does the point of impact coincide with the point of aim. If only a portion of the target is visible (e.g., the head of an enemy soldier), the trajectory of the bullet may have to be taken into consideration when firing at a distance less than 300 yards/meters. If a Marine does not consider trajectory, he may shoot over the top of the target if the target is small and at a distance less than 300 yards/meters. See figure 10-5.

Windage

Predetermined points of aim sector the target vertically (see fig. 10-6). The tip of the front sight post centered on the edge of the target into the wind is considered one point of aim; the trailing edge of the front sight post held on the edge of the target into the wind is considered two points of aim. The same units of measure are applied off the target for holds of additional points of aim. These points of aim are used to compensate for wind affecting the strike of the round and when there is no time to adjust the rifle's sights, or when a lead is required to engage a moving target (points of aim for moving targets are discussed in paragraph 10007). Table 10-1 provides points of aim for full value winds.

Known Strike of the Round

This offset aiming technique shifts the aiming point (sight picture) to compensate for rounds that strike off target center. The known strike of the round method is used if the strike of the round is known. To engage a target using this method, a Marine aims an equal distance from center mass opposite the known strike of the round. For example, if the round strikes high and left, a Marine aims an equal and opposite distance low and right.

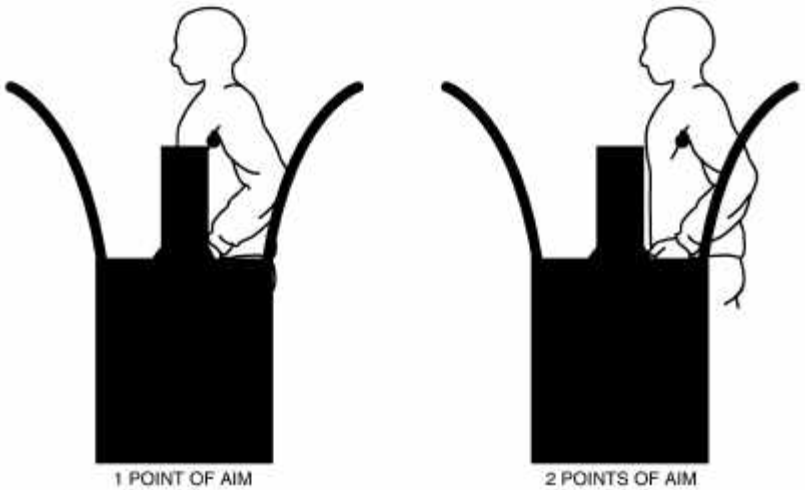


Figure 10-6. Points of Aim.

Table 10-1. Points of Aim for Full Value Winds.

Wind	Distance (yards/meters)	Points of Aim
Light	0-300	0
Medium	200-300	1
Strong	0-200	1
Strong	200-300	2

10004. Techniques of Fire

The size and distance to the target should dictate the technique of fire.

Two-Shot Technique

In combat, an effective technique for eliminating a threat is to rapidly fire more than one shot on the target. Two shots fired in rapid succession will increase the trauma (i.e., shock, blood loss) on the target, increasing the Marine's chances of quickly eliminating the threat. Firing two shots enables the Marine to break out of the tunnel vision often associated with firing in combat and then assess the situation to determine follow-on action. To execute the two-shot technique, the Marine acquires sight picture for each shot fired (each pull of the trigger).

Single Shot Technique

If the target is at a long range or if the target is small (i.e., partially exposed), it can best be engaged with a single, precision shot. A Marine's stability of hold and sight alignment are more critical to accurate engagement of long-range or small targets. To engage a target with the single shot technique, the Marine must slow down the application of the fundamentals and place one well-aimed shot on target.

Sustained Rate of Fire

An effective method for delivering suppressive fire is to fire at the sustained rate of 12 to 15 rounds per minute. Management of recoil is critical to bring the sights back on target after the shot is fired.

Three-Round Burst Technique

When set on burst, the design of the rifle permits three shots to be fired from a single trigger pull. The rounds fire as fast as the weapon will function and cause the muzzle to climb during recoil. The ability to manage recoil is extremely important when firing the rifle on burst. To achieve the desired effect (i.e., 3 rounds on target), the Marine must control the jump angle of the weapon to maintain the sights on target. At short ranges (i.e., 25 meters or less), firing on three-round burst can be an effective technique to place rounds on a man-sized target quickly to increase trauma on the target. To execute the three-round burst technique, the Marine places the selector lever on burst, aims center mass, and acquires sight picture once for the single trigger pull.

10005. Engaging Immediate Threat Targets

Immediate threat target engagement is characterized by short-range engagement (i.e., less than 50 meters) with little or no warning that requires an immediate response to engage an enemy. This type of engagement is likely in close terrain (e.g., urban, jungle). If this type of engagement is likely, the large rear sight aperture (0-2) could be placed up to provide a wider field of view and detection of targets. Marksmanship skills include quick presentation and compression of the fundamentals (i.e., quick acquisition of sight picture, uninterrupted trigger control). At close ranges, perfect sight alignment is not as critical to accuracy on target. However, the front sight post must be in the rear sight aperture; proper sight alignment is always the goal.

10006. Engaging Multiple Targets

When engaging multiple targets, a Marine must prioritize each target and carefully plan his shots to ensure successful target engagement. Mental preparedness and the ability to make split-second decisions are the key to successful engagement of multiple targets. The proper mindset allows a Marine to react instinctively and to control the pace of the battle rather than just reacting to the threat.

After the first target is engaged, a Marine must immediately engage the next target and continue to engage targets until they are eliminated. While engaging multiple targets, a Marine must be aware of his surroundings and not fixate on just one target. He must rapidly prioritize the targets, establish an engagement sequence, and engage the targets. A Marine also must maintain constant awareness and continuously search the terrain for additional targets.

Prioritizing Targets

The combat situation will usually dictate the order of multiple target engagement. Target priority is based on factors such as proximity, threat, and opportunity; no two situations will be the same. The principal method is to determine the level of threat for each target so all may be engaged in succession from the most threatening to the least threatening. The target that poses the greatest threat (e.g., closest, greatest firepower) should be engaged first. Prioritizing targets is an ongoing process. Changes in threat level, proximity, or the target itself may cause a Marine to revise his priorities. Therefore, a Marine must remain alert to changes in a target's threat level and proximity and other target opportunities as the battle progresses.

Technique of Engagement

To engage multiple targets, the Marine performs the following steps:

- The first target with two rounds.
- The recoil of the rifle can be used to direct the recovery of the weapon on to the next target. As the weapon is coming down in its recovery, the Marine physically brings the sights onto the desired target. Pressure is maintained on the trigger throughout recovery and trigger control is applied at a rate consistent with the Marine's ability to establish sight picture on the desired target.
- When possible, such as when all targets are of equal threat, the Marine should engage targets in a direction that maximizes his ability to support and control the weapon.
- The preceding steps are repeated until all targets have been engaged.

Firing Position

The selection and effective use of a firing position are critical to the successful engagement of multiple targets. A Marine should make a quick observation of the terrain and select a firing position that provides good cover and concealment, as well as the flexibility to engage multiple targets. If enemy targets are widely dispersed, the selected position must provide the Marine with flexibility of movement. The more restrictive the firing position, the longer it will take a Marine to eliminate multiple targets.

Prone

The prone position limits left and right lateral movement and is, therefore, not recommended for engaging short-range dispersed targets. Because the elbows are firmly placed on the ground in the prone position, upper body movement is restricted.

Sitting

Like the prone position, the sitting position allows limited lateral movement. This makes engagement of widely-dispersed multiple targets difficult. To ease engagement, the forward arm can be moved by pivoting on the elbow, but this movement disturbs the stability of the position.

Kneeling

The kneeling position provides a wider, lateral range of motion since only one elbow is used for support. A Marine moves from one target to another by rotating at the waist to move the forward arm in the direction of the target, either right or left.

Standing

The standing position allows maximum lateral movement. Multiple targets are engaged by rotating the upper body to a position where the sights can be aligned on the desired target. If severe or radical adjustments are required to engage widely dispersed targets, a Marine moves his feet to establish a new position rather than give up maximum stability of the rifle. This avoids poorly placed shots that can result from an unstable position.

10007. Engaging Moving Targets

In combat, it is unlikely that a target will remain stationary. The enemy will move quickly from cover to cover, exposing himself for the shortest possible time. Therefore, a Marine must quickly engage a moving target before it disappears.

Types of Moving Targets

There are two types of moving targets: steady moving targets and stop and go targets. Steady moving targets move in a consistent manner and remain in a Marine's field of vision. A walking or running man is an example of a steady moving target. A stop and go target appears and disappears during its movement. A stop and go target will present itself for only a short time before it reestablishes cover. An enemy moving from cover to cover is an example of a stop and go target. This target is most vulnerable to fire at the beginning and end of its movement to new cover because the target must gain momentum to exit its existing cover and then slow down to occupy a new position.

Leads

When a shot is fired at a moving target, the target continues to move during the time the bullet is in flight. Therefore, a Marine must aim in front of the target; otherwise, the shot will fall behind the target. This is called leading a target. Lead is the distance in advance of the target that the rifle sights are placed to accurately engage the target when it is moving.

Amount of Lead Required

Factors that affect the amount of lead are the target's range, speed, and angle of movement.

Range. Lead is determined by the rifle's distance to the target. When a shot is fired at a moving target, the target continues to move during the time the bullet is in flight. This time of flight could allow a target to move out of the bullet's path if the round was fired directly at the target. Time of flight increases as range to the target increases. Therefore, the lead must be increased as the distance to the target increases.

Speed. If a man is running, a greater lead is required because the man will move a greater distance than a walking man will while the bullet is in flight.

Angle of Movement. The angle of movement across the line of sight relative to the flight of the bullet determines the type (amount) of lead.

Three Types of Leads: Full, Half, No

- **Full Lead**. The target is moving straight across a Marine's line of sight with only one arm and half the body visible. This target requires a full lead because it will move the greatest distance across a Marine's line of sight during the flight of the bullet.
- **Half Lead**. The target is moving obliquely across a Marine's line of sight (at a 45-degree angle). One arm and over half the back or chest are visible. This target requires half of a full lead because it will move half as far as a target moving directly across a Marine's line of sight during the flight of the bullet.
- **No Lead**. The target is moving directly toward or away from a Marine and presents a full view of both arms and the entire back or chest. No lead is required. A Marine engages this target as if it were a stationary target because it is not moving across his line of sight.

Point of Aim Technique

Predetermined points of aim sector the target vertically. The tip of the front sight post centered on the leading edge of the target is considered one point of aim; the trailing edge of the front sight post held on the leading edge of the target is considered two points of aim. The same units of measure are applied off the target for holds of additional points of aim. These points of aim are used to compensate when a lead is required to engage a moving target. The following guidelines apply if a Marine uses the point of aim technique to establish a lead for a moving target at various ranges and speeds (see fig. 10-7, on page 10-10). These guidelines do not consider wind or other effects of weather. Body width in these examples is considered to be 12 inches (30 centimeters) (side view of the target).

For a slow walking target (approximately 2 to 2.5 mph/3.2 to 4 kph) moving directly across the line of sight (full lead)—

- At a range of 200 meters or less, no lead is required.
- At a range of 300 meters, hold one point of aim in the direction the target is moving.

For a fast walking target (approximately 4 mph/6.4 kph) moving directly across the line of sight (full lead)—

- At a range of 200 meters or less, hold one point of aim in the direction the target is moving.
- At a range of 300 meters, hold two points of aim in the direction the target is moving.

For a target running (approximately 6 mph/9.7 kph) directly across the line of sight (full lead)—

- At a range of 100 meters or less, hold one point of aim in the direction the target is moving.

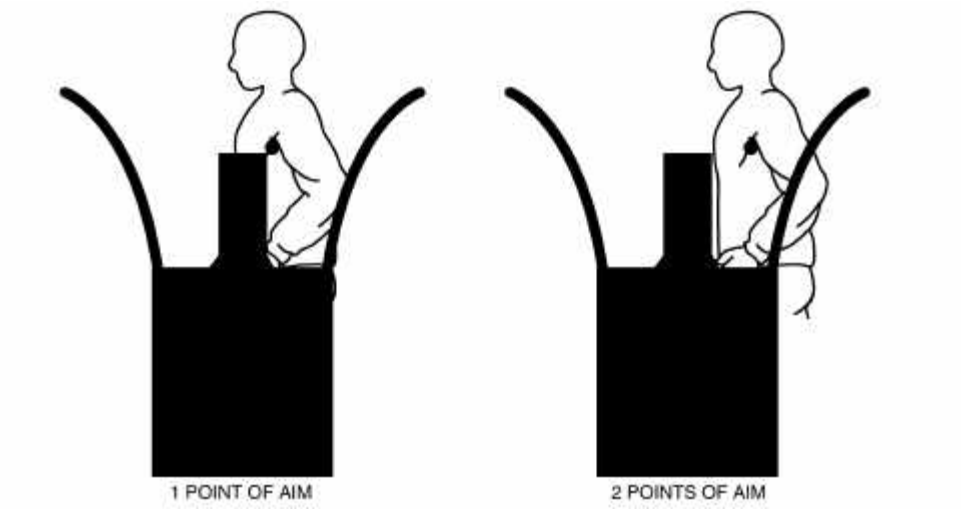


Figure 10-7. Points of Aim.

- At a range of 200 meters, hold two points of aim in the direction the target is moving.

For a target moving at a 45-degree angle (an oblique target) across the line of sight, the lead is one half of the lead that is required for a target moving directly across the line of sight.

Engagement Methods

Moving targets are the most difficult targets to engage. However, they can be engaged successfully by using the tracking or the ambush method.

The Tracking Method

The tracking method is used for a target that is moving at a steady pace over a well-determined route. If a Marine uses the tracking method, he tracks the target with the rifle's front sight post while maintaining sight alignment and a point of aim on or ahead of (leading) the target until the shot is fired. When establishing a lead on a moving target, rifle sights will not be centered on the target and instead will be held on a lead in front of the target. See figure 10-8. A Marine performs the following steps to execute the tracking methods:

- Present the rifle to the target.
- Swing rifle muzzle through the target (from the rear of the target to the front) to the desired lead (point of aim). The point of aim may be on the target or some point in front of the target depending upon the target's range, speed, and angle of movement.
- Track and maintain focus on the front sight post while acquiring the desired sight picture. It may be necessary to shift the focus between the front sight post and the target while acquiring sight picture, but the focus must be on the tip of the front sight post when the shot is fired.
- Engage the target once sight picture is acquired while maintaining the proper lead.
- Follow-through so the lead is maintained as the bullet exits the muzzle.
- Continue to track in case a second shot needs to be fired on the target.

The Ambush Method

The ambush method is used when it is difficult to track the target with the rifle, as in the prone, sitting, or any supported position. The lead required to effectively engaging the target determines the engagement point. With the sights settled, the target moves into the predetermined engagement point and creates the desired sight picture. See figure 10-9.

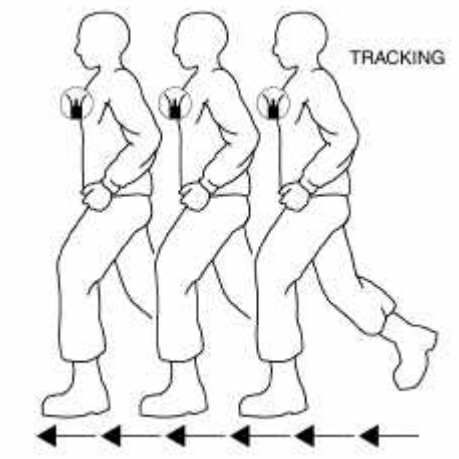


Figure 10-8. Tracking Method.

The trigger is pulled simultaneously with the establishment of sight picture. To execute the ambush method, a Marine performs the following steps:

- Select an aiming point ahead of the target.
- Obtain sight alignment on the aiming point.
- Hold sight alignment until the target moves into vision and the desired sight picture is established.
- Engage the target once sight picture is acquired.
- Follow-through so the rifle sights are not disturbed as the bullet exits the muzzle.

A variation of the ambush method can be used when engaging a stop and go target. A Marine should look for a pattern of exposure (e.g., every 15 seconds). Once a pattern is determined, a Marine establishes a lead by aiming at a point in front of the area in which the target is expected to appear, then he fires the shot at the moment the target appears.

Marksmanship Fundamentals

Engaging moving targets requires concentration and adherence to the fundamentals of marksmanship. The following modifications to the fundamentals of marksmanship are critical to engagement of moving targets.

Sight Picture

Typically, sight picture is the target's center of mass. If a Marine engages a moving target, he bases his sight picture on the target's range, speed, and angle of movement, i.e., sight alignment may be established on a point of aim in front of the target.

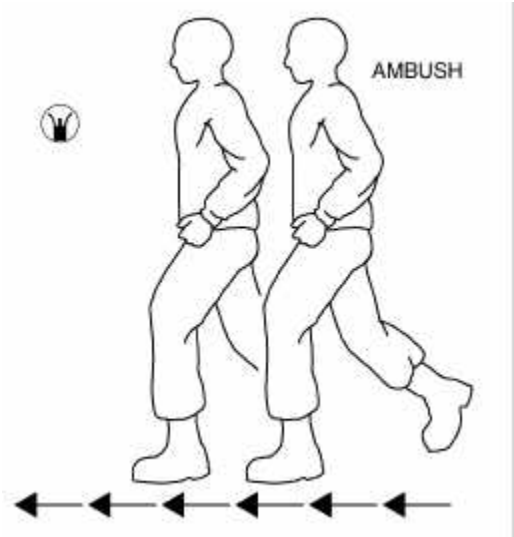


Figure 10-9. Ambush Method.

Trigger Control

As with any target engagement, trigger control is critical to the execution of shots. A Marine can apply pressure on the trigger prior to establishing sight picture, but there should be no rearward movement of the trigger until sight picture is established. Interrupted trigger control is not recommended because the lead will be lost or have to be adjusted to reassume proper sight picture. When using the tracking method, continue tracking as trigger control is applied to ensure the shot does not impact behind the moving target.

Follow-through

If a Marine uses the tracking method to engage moving targets, he continues to track the target during follow-through so the desired lead is maintained as the bullet exits the muzzle. Continuous tracking also enables a second shot to be fired on target if necessary.

Stable Position

To engage moving targets using the tracking method, the rifle must be moved smoothly and steadily as the target moves. A stable position steadies the rifle sights while tracking. Additional rearward pressure may be applied to the pistol grip to help steady the rifle during tracking and trigger control. Elbows may be moved from the support so the target can be tracked smoothly.

10008. Engaging Targets at Unknown Distances

Hasty Sight Setting

While a BZO is considered true for 300 meters, a Marine must be capable of engaging targets beyond this distance. The rifle's sighting system allows sight settings for distances out to 800 meters in 100-meter increments. If a Marine must establish a BZO for extended ranges, it is referred to a hasty sight setting. To achieve a hasty sight setting, a Marine dials the appropriate range numeral on the rear sight elevation knob that corresponds to the range to the target. For example, if the rear sight elevation knob is set at 8/3 and a target appears at 500 meters, rotate the knob to the 5 setting.

Note

Upon completion of firing with a hasty sight setting for extended ranges, return the rear sight to the BZO setting.

Point of Aim Technique

If the distance to the target is beyond the BZO capability of the rifle and time does not permit adjustment of the sights, a Marine can use offset aiming techniques to apply a point of aim for elevation to engage the target. See paragraph 10003.

10009. Engaging Targets During Low Light and Darkness

Combat targets are frequently engaged during periods of darkness or under low-light conditions. Although basic marksmanship fundamentals do not change, the principles of night vision must be applied and target detection is applied differently. During periods of darkness or low light, a Marine's vision is extremely limited. A Marine must apply the techniques of night observation in order to detect potential targets, and he must develop skills that allow him to engage targets under these conditions.

Night Vision

A Marine can improve his ability to see during periods of darkness or low light by obtaining and maintaining night vision. Since adapting to night vision is a slow and gradual process, steps should be taken to protect night vision once it is obtained.

Obtaining Night Vision

There are two methods used to obtain night vision. The first method is to remain in an area of darkness for about 30 minutes. This area can be indoors or outdoors. The major disadvantage of this approach is that an individual is not able to perform any tasks while acquiring night vision in total darkness. The second method is to remain in a darkened area under low intensity red light (similar to the light used in a photographer's darkroom) for about 20 minutes, followed by about 10 minutes in darkness without the red light. This method produces almost complete night vision adaptation while permitting the performance of some tasks during the adjustment period.

Maintaining Night Vision

Because the eyes take a long time to adjust to darkness, it is important to protect night vision once it is acquired. To maintain night vision—

- Avoid looking at any bright light. Bright light will eliminate night vision and require readaptation.
- Shield eyes from parachute flares, from spotlights or from headlights.
- When using a flashlight to read a map or any other written material:
  - Put one hand over the glass to limit the area illuminated and the intensity of the light. Keeping one eye shut will reduce the amount of night vision lost.
  - Cover the light with a red filter to help reduce the loss of night vision.
  - Minimize the time spent using a flashlight.

Factors Affecting Night Vision

Some physical factors may affect your night vision and reduce your ability to see as clearly as possible in low light or darkness. These factors include—

- Fatigue.
- Lack of oxygen.
- Long exposure to sunlight.
- Heavy smoking.
- Drugs.
- Headaches.
- Illness.
- Consumption of alcohol within the past 48 hours.
- Improper diet.

Searching Methods

Once night vision has been acquired, the Marine can locate targets. Some daylight observation techniques (e.g., searching for target indicators) also apply during periods of darkness or low light.

Off-center Vision

Off-center vision is the technique of keeping the attention focused on an object without looking directly at it (see fig. 10-10). To search for targets using off-center vision, never look directly at the object you are observing. You will see the object much better by using off-center vision. Look slightly to the left, right, above or below the object. Experiment and practice to find the best off-center angle for you. For most people, it is about 6 to 10 degrees away from the object, or about a fist's width at arm's length.

Note

Staring at a stationary object in the dark may make it appear to be moving. This occurs because the eye has nothing on which

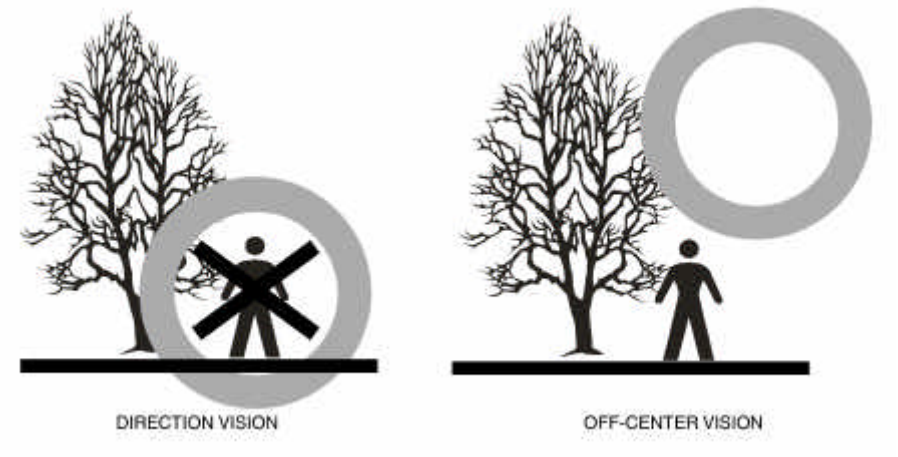


Figure 10-10. Off-center Vision.

to reference the exact position of the object. This illusion can be prevented by visually aligning the object against something else, such as a finger at arm's length.

Scanning/Figure Eight Scan

Scanning is the use of off-center vision to observe an area or object and involves moving the eyes in a series of separate movements across the objective area.

A common method of scanning is to move the eyes in a figure eight pattern (see fig. 10-11). A Marine moves the eyes in short, abrupt, irregular movements over and around the area. Once a target indicator is detected, focus is concentrated in that area, but not directly at it. Pause a few seconds at each point of observation since the eyes cannot focus on a still object while in motion. Rest the eyes frequently when scanning.

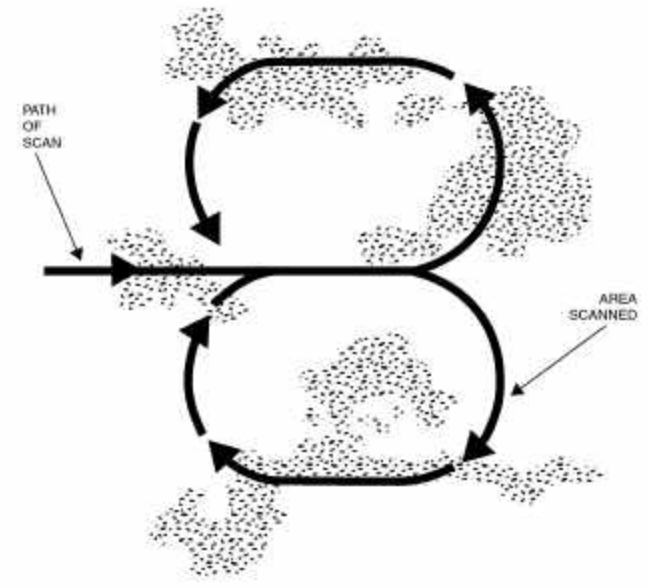


Figure 10-11. Figure Eight Scan.

While you are observing, there may be periodic blackouts of night vision due to simple fatigue. This is normal and is not a cause for alarm. Night vision will quickly return after the eyes are moved and blinked a few times.

It is more effective to scan from a prone position or a position closer to the ground than the object being observed. This creates a silhouetted view of the object.

When scanning an area, look and listen for the same target indicators as in daylight: movement, sound, and improper camouflage.

Objects in bright moonlight/starlight cast shadows just as in sunlight.

Sound seems louder at night than during daylight.

Types of Illumination

There are two types of illumination that assist engagement during low light or darkness: ambient light and artificial illumination. Both ambient light and artificial illumination can affect target perception (distance and size) and night vision capabilities.

- Ambient light is the light produced by natural means (i.e., the sun, moon, and stars). Variations occur in ambient light due to the time of day, time of year, weather conditions, terrain, and vegetation.
- Artificial illumination is the light produced by a process other than natural means. Artificial light can be used to illuminate an area for target detection

or to illuminate a specific target to pinpoint its position. There are two types of artificial illumination used in combat: air and ground.

Effects of Illumination

In some combat situations, ambient light and artificial illumination may assist a Marine in locating targets. However, this light can affect perception of the target and disrupt night vision. The introduction of artificial light requires the eyes to make a sudden, drastic adjustment to the amount of light received. This can cause a temporary blinding because night vision was abruptly interrupted. Ambient light also can cause a blinding effect; e.g., a Marine may experience temporary blindness or reduced night vision if a bright moon suddenly appears from behind the clouds.

- Light behind a Marine or light between the Marine and a target illuminates the front of the target and makes it appear closer than it is.
- Light beyond the target displays the target in silhouette and makes it appear farther away than it is. If the target is silhouetted, it is easier to see and easier to engage.
- Air illumination devices are in constant motion as they descend to the ground. This movement creates changing shadows on any illuminated target causing a stationary target to appear as if it is moving.

10010. Engaging Targets while Wearing the Field Protective Mask

While engaging targets in a combat environment, a Marine is under considerable stress caused by fear, fatigue, and the noise of battle. His stress is further aggravated by the fear and uncertainty associated with a nuclear, biological, and chemical (NBC) threat. However, a Marine must be able to operate under any battlefield condition, including an NBC environment. If a Marine wears the field protective mask, its bulk and reduced visibility can affect his firing position which in turn affects the rifle's zero and his ability to engage the target. A Marine must make adjustments to his firing position and the application of marksmanship fundamentals to counter the additional gear worn in an NBC environment. Therefore, a Marine should practice wearing his field protective mask when he is not in a combat environment. This allows him to overcome any restrictions caused by the mask, develop confidence in his ability to execute well-aimed shots while wearing the mask, and develop a plan of action. This plan should address how the rifle is presented to the target, how long the mask is worn, and the likelihood of enemy contact. If a Marine expects to wear the mask for an extended period and enemy contact is likely, he should consider adjusting the rifle sights so that his first rounds are on target.

Marksmanship Fundamentals

Wearing the field protective mask requires a Marine to make modifications to his aiming and breath control techniques.

Aiming

Wearing the field protective mask affects the aiming process and the ability to locate targets. The bulk of the mask may require an adjustment to stock weld, eye relief, head position, and placement of the buttstock in the shoulder.

Breath Control

Wearing the field protective mask affects breath control because breathing may be more difficult. Temporary fogging of the lens also may be experienced. If fogging occurs, a Marine should take a deep breath and fire while holding a full breath of air (inhaling clears the fog).

Firing Position

A good firing position provides balance, control, and stability during firing. The field protective mask's added bulk and other restrictions may require a Marine to make changes to his firing position. The adjustments are unique to each Marine and based on his body size and shape and his ability to adapt to the mask. Adjustments should be minor. However, all firing positions will be affected in the following areas:

Stock Weld

Changing the placement of the cheek on the stock may affect the rifle's BZO. Therefore, a Marine should obtain a BZO for the rifle in full mission-oriented protective posture gear. Stock weld will not be as comfortable or feel as solid as it does without the field protective mask. The loss of sensitivity between the cheek and the stock, due to the mask, may cause the cheek to be pressed too firmly against the stock. Pressing the cheek too firmly against the stock can cause the seal of the field protective mask to break. If this occurs, quickly clear the mask and resume a firing position. If the lens of the field protective mask fogs up

while in a firing position, this indicates that the mask's seal has been broken. Clear the mask and resume the firing position.

Eye Relief

The added bulk of the field protective mask may increase eye relief because the head is farther back along the stock. If the eye is too far from the rear sight aperture it may be difficult to acquire the target and to maintain sight picture; if the eye is too close, the rear sight can hit the mask, possibly breaking a lens or its seal.

Head Position

The mask's shape and bulk can make sight alignment difficult to achieve. The restrictive vision caused by the mask may force a Marine to roll or tilt his head over the stock to achieve sight alignment. The Marine should keep his head as erect as possible while maintaining sight alignment.

Placement of Buttstock in the Shoulder

Placement of the buttstock in the shoulder pocket may have to be altered due to the mask's added bulk. If the rifle is canted, a Marine may place the buttstock of the rifle just outside the pocket of the shoulder to achieve sight alignment. Holding the rifle straight is the preferred method of obtaining sight alignment. However, if sight alignment cannot be achieved in this position, a Marine may alter the hold of the rifle to bring the aiming eye in line with the sights. Canting the rifle drastically affects the rifle's zero. A Marine should cant the rifle only as much as is needed to obtain a good stock weld and proper sight alignment. If the rifle is canted, the point of impact may not coincide with the point of aim. For example, when wearing the mask, a right-handed Marine's point of impact is usually high and to the left of center mass (for a left-handed Marine, high and to the right of center mass). Therefore a Marine has to offset aim an equal and opposite distance low and to the right. See paragraph 10003 for a discussion on offset aiming and the known strike of the round technique.

Appendix A

DATA BOOK

Note

The principles for recording data in the data book are the same for the Entry Level Rifle (ELR) Program and the Sustainment Level Rifle (SLR) Program. This appendix provides generic information for completing the data book. Specifics pertaining to each program are contained in the ELR and SLR lesson plans.

1. Data Book

Of all the tools that assist the Marine in firing accurately and consistently, the data book, if properly used, is the most valuable asset. It contains a complete record of every shot fired and the weather conditions and their effects on shooting. When used properly it will assist the Marine in establishing and maintaining a battlesight zero (BZO).

2. Recording Data Before Firing

Recording information in the data book prior to firing saves valuable time on the firing line that should be used to prepare for firing. Some information can be recorded before going to the firing line. In the BEFORE FIRING section of the data book, record the following (see fig. A-1):

True Zero

Front Elevation

Enter the front sight post setting by recording the number of clicks up (+) or down (-) under FRONT ELEV.

Rear Elevation

Circle the rear sight elevation knob setting under REAR ELEV for the yard line firing from—

- 200 yards: 8/3-2
- 300 yards: 8/3
- 500 yards: 5

Note

At 500 yards, the rear sight elevation knob setting may be plus or minus one or two clicks off of 5.

Wind

Under the WIND column under TRUE ZERO, the R represents clicks right on the rifle from the initial sight setting and the L represents clicks left on the rifle. Enter the rear sight windage knob setting by recording the number of clicks right (clockwise) or left (counterclockwise) under WIND.

Wind

Prior to firing, check the wind. If wind conditions are present, a sight adjustment will have to be made prior to firing to ensure shots impact the center of the target.

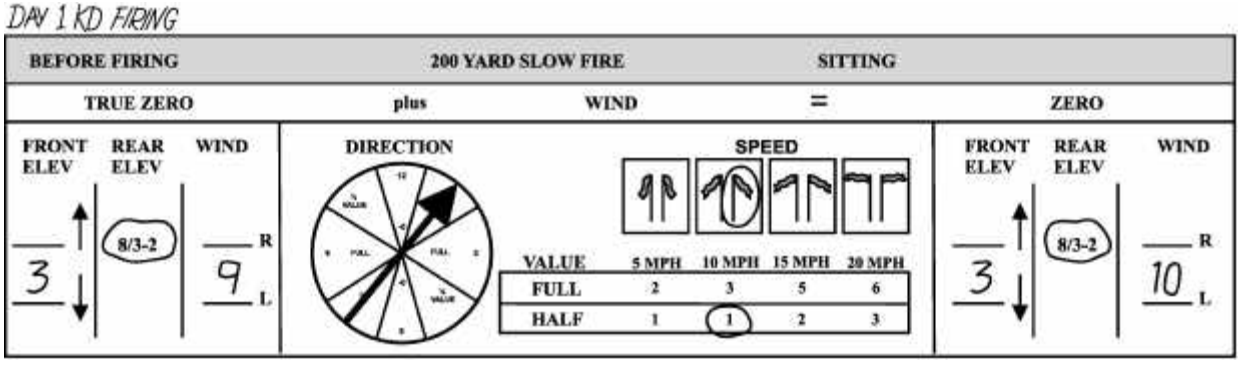


Figure A-1. Recording Data Before Firing.

Direction

Determine the direction of the wind and draw an arrow through the clock indicating the direction the wind is blowing. If the wind is not blowing, a data entry is not needed.

Note

Remember that your position is represented in the center of the clock and the target is at 12 o'clock.

Value

Look at the clock to determine if the wind is full, half, or no value wind. Under VALUE, circle FULL or HALF to indicate the wind value.

Speed

Observe the flag on the range and circle the appropriate flag indicating the wind's velocity (SPEED).

Determining Windage Adjustment

The chart beneath the flag indicates the number of clicks on the rear sight windage knob to offset the effects of the wind. Circle the number of clicks where the wind value and wind speed intersect.

Zero

Determine the zero you will place on your rifle to accommodate wind conditions to begin firing. This ZERO will be the TRUE ZERO plus the rear sight windage setting to compensate for the effects of wind.

Front Elev and Rear Elevation

Elevation adjustments are not affected by wind so the same settings are carried over from TRUE ZERO.

Wind

Wind will affect the strike of the round right or left on the target. Therefore, if wind is a factor, the rear sight windage knob must be adjusted to compensate for the effects of wind.

If the wind is blowing, add the number of clicks circled under the flags to the rear sight windage knob setting from TRUE ZERO.

Once the windage setting is determined, record it in the WIND column.

3. Recording Data During Firing

Recording Data During Slow Fire Stages

The method for calling and plotting slow fire shots in the data book is called "the shot behind method." It allows the Marine to spend less time recording data and more time firing on the target. This is because all the calling and plotting is done while the target is in the pits being marked. This information is recorded in the DURING FIRING portion of the data book page. The proper and most efficient method for recording data during KD slow fire stages is as follows (see fig. A-2):

Fire the First Shot

Fire the first shot. Then immediately check the wind flag to see if the speed or direction of the wind changed. If the wind direction changed, indicate the windage adjustment needed to compensate for it in the WIND row under CALL number 1. This windage adjustment will have to be applied to the rifle prior to firing the second shot.

Call the Shot Accurately

As soon as the shot is fired and the target is pulled into the pits, record the exact location where the tip of the front sight was on the target at the exact instant the shot was fired (assuming sight alignment was maintained). Plot this location on the target provided under number 1 in the block marked CALL.

Prepare to Fire the Second Shot

As soon as you have recorded the call for the first shot, prepare to fire the second shot.

Look at Where the First Shot Hit

As the target reappears out of the pits, look where the first shot hit the target. Remember this location so it can be plotted after firing the second shot.

Fire the Second Shot

Fire the second shot. Then check the wind flag to see if the wind changed speed or direction.

Call the Second Shot and Plot the First Shot

As soon as the second shot is fired and the target is pulled into the pits, record the call of the second shot.

Now plot the precise location of the first shot by writing the numeral 1 on the large target diagram provided in the block marked PLOT.

Prepare to Fire the Third Shot

Repeat steps until all shots have been fired. Indicate each slow fire shot with the appropriate number (e.g., 1, 2, 3, 4, 5).

Make a Sight Adjustment if Required

Sight adjustments should be made off of a shot group, not a single shot. Determine if a sight adjustment is necessary off of the first three shots fired. If the shots form a group (i.e, a group that fits inside the "A" target bull's-eye or the center scoring ring of the "D" target), but are not where they were called, make the necessary sight adjustment.

CAUTION

Generally, major sight adjustments from established sight settings are caused by poor application of the fundamentals, inconsistencies in firing positions, inconsistencies in sight picture at different ranges and different positions, and inconsistent tension on the sling. Every effort should be made to correct shooting errors prior to making a sight adjustment on the rifle.

Note

The plotting targets in the data book for the KD Course of Fire are in inches, requiring you to calculate the number of clicks to center your shot groups.

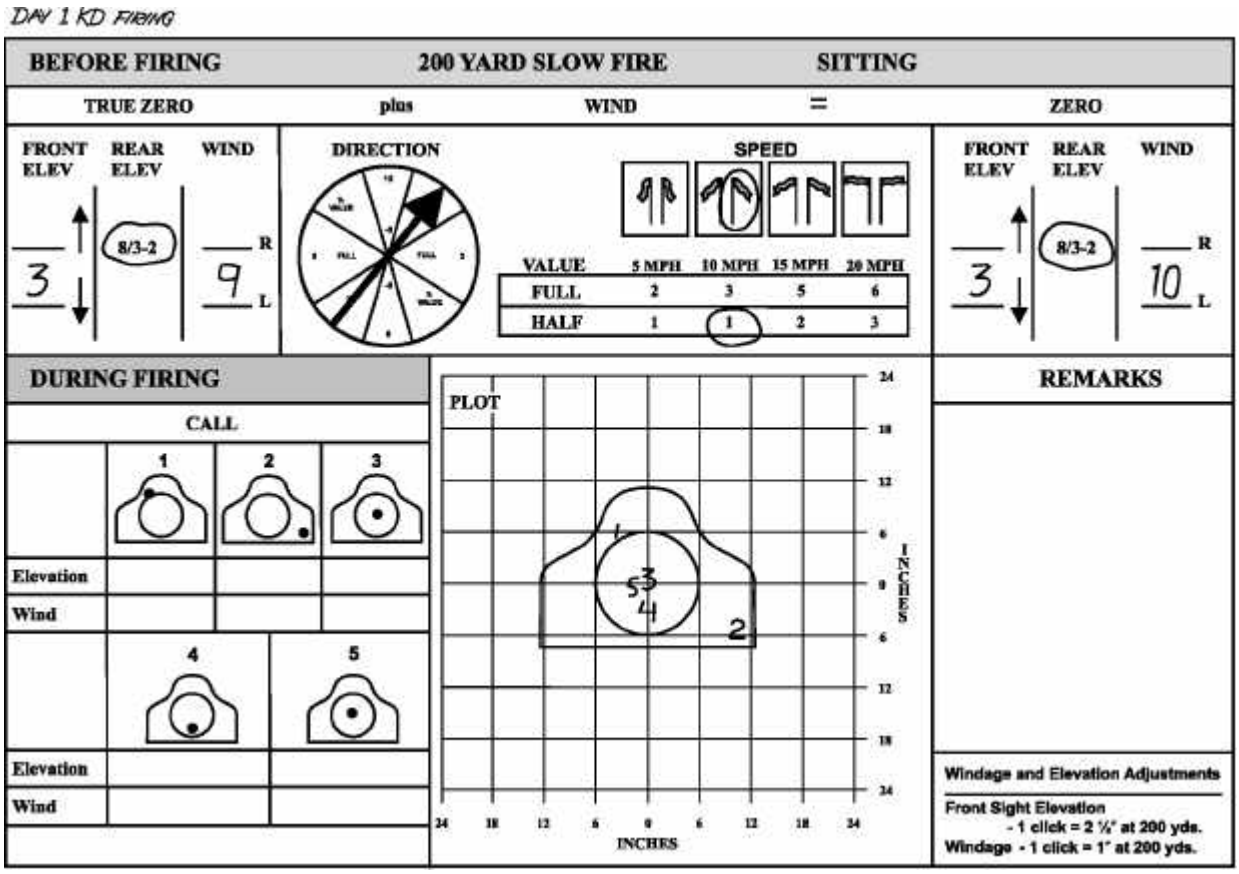


Figure A-2. Recording Slow Fire Data During Firing.

Elevation. Locate the closest horizontal grid line to the center of the plotted shot group. Follow the line across to the numbered vertical scale to determine the number of inches of elevation the shot group is off of target center. Calculate the number of clicks on your front sight post (for 200 and 300 yards) or rear sight elevation knob (for 500 yards) to bring your shot group center.

Windage. Locate the closest vertical grid line to the center of the plotted shot group. Follow the line down to the numbered horizontal scale to determine the number of inches of windage the shot group is off of target center. Calculate the number of clicks on your rear sight windage knob to bring shot group center.

Recording Data During Rapid Fire Stages

In the DURING FIRING section of the data book, record the following (see fig. A-3):

Mentally Call Shots While Firing

While firing the rapid fire string, make a mental note of any shots called out of the group.

Plot the Shot Group

After firing the rapid fire string, and when the target is marked, plot all visible hits with a dot precisely where they appear on the large target diagram in the block marked PLOT.

Make a Sight Adjustment if Required

Locate the center of the shot group. If the shots form a group, make the necessary sight adjustments off of the center of the group. If shots do not form a group and do not just contain a poor shot, do not make a sight adjustment. Determine the sight adjustment by locating the center of the shot group and using the grid lines on the target in the data book. These grid lines represent the number of inches to bring a shot group center. Looking at the shot group:

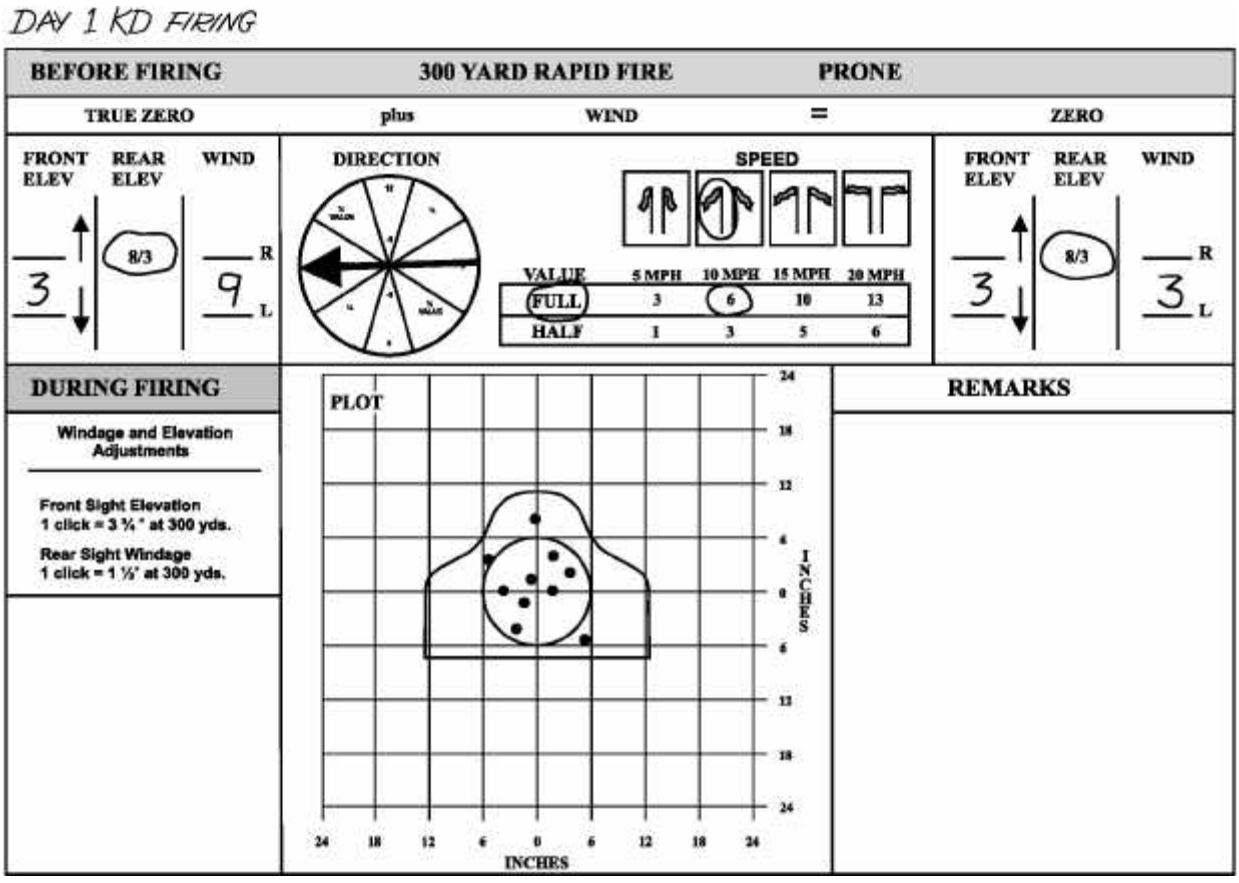


Figure A-3. Recording Rapid Fire Data During Firing.

CAUTION

Generally, major sight adjustments from established sight settings are caused by poor application of the fundamentals, inconsistencies in firing positions, inconsistencies in sight picture at different ranges and different positions, and inconsistent tension on the sling. Every effort should be made to correct shooting errors prior to making a sight adjustment on the rifle.

Note

The plotting targets in the data book for the KD Course of Fire are in inches, requiring you to calculate the number of clicks to center your shot groups.

Elevation. Locate the closest horizontal grid line to the center of the plotted shot group. Follow the line across to the numbered vertical scale to determine the number of inches of elevation the shot group is off of target center. Calculate the number of clicks on your front sight post to bring your shot group center.

Windage. Locate the closest vertical grid line to the center of the plotted shot group. Follow the line down to the numbered horizontal scale to determine the number of inches of windage the shot group is off of target center. Calculate the number of clicks on your rear sight windage knob to bring your shot group center.

Remarks

After firing a stage, record any data or information that can be helpful in improving shooting in the future. Anything done or observed should be recorded. These items will be helpful when analyzing daily shooting performance. Record this information in the REMARKS column. What the Marine fails to record may be the information he will need to improve.

4. Recording Data After Firing

In the AFTER FIRING section of the data book, record the following (see fig. A-4 on page A-6):

Zero

Upon completion of firing, determine the elevation and windage required to center the shot group (if necessary) and record this sight setting in the ZERO block of the AFTER FIRING section. If no adjustments are needed to center the shot group, record the sight settings currently on the rifle.

Front Elevation

Under the column FRONT ELEV, record the final elevation setting made on the front sight post.

Rear Elevation

Under the column REAR ELEV, record the rear sight elevation knob setting for the yard line firing from.

Note

If firing from 500 yards, record the final elevation setting made on the rear sight elevation knob.

Wind

Under the column WIND under ZERO, record final windage setting made on the rear sight windage knob.

Wind

Calculate the prevailing wind during the string of fire.

Direction

Determine the direction of the wind and draw an arrow through the clock indicating the direction the wind is blowing.

Note

Remember that your position is represented in the center of the clock and the target is at 12 o'clock.

Value

Look at the clock to determine if the wind is full, half, or no value wind. Under VALUE, circle FULL or HALF to indicate the wind value.

Speed

Observe the flag on the range and circle the appropriate flag indicating the wind's velocity (SPEED).

Determine Windage Adjustment

The chart beneath the flag indicates the number of clicks on the rear sight windage knob to offset the effects of the wind. Circle the number of clicks where the wind value and wind speed intersect.

True Zero

A true zero is the established zero without the windage adjustments to compensate for the effects of the string of fire's wind. A true zero is calculated because, the next time you fire, the wind conditions will probably be different. Therefore, the rear sight windage knob adjustments made to compensate for the string of fire's wind will not be the correct setting for wind conditions on other strings of fire or other days of firing.

Front Elevation and Rear Elevation

Because elevation adjustments are not affected by wind, the same settings are carried over from ZERO.

Wind

Calculate the windage adjustment to compensate for the string of fire's wind conditions the same way it was calculated in the BEFORE FIRING information of the data book. The only exception is now windage adjustments are being removed from the rifle rather than added to the rifle. Because the windage setting is being removed from the rifle, remove the number of clicks of windage right or left from the ZERO windage setting. Once the windage setting is determined, record it in the WIND column.

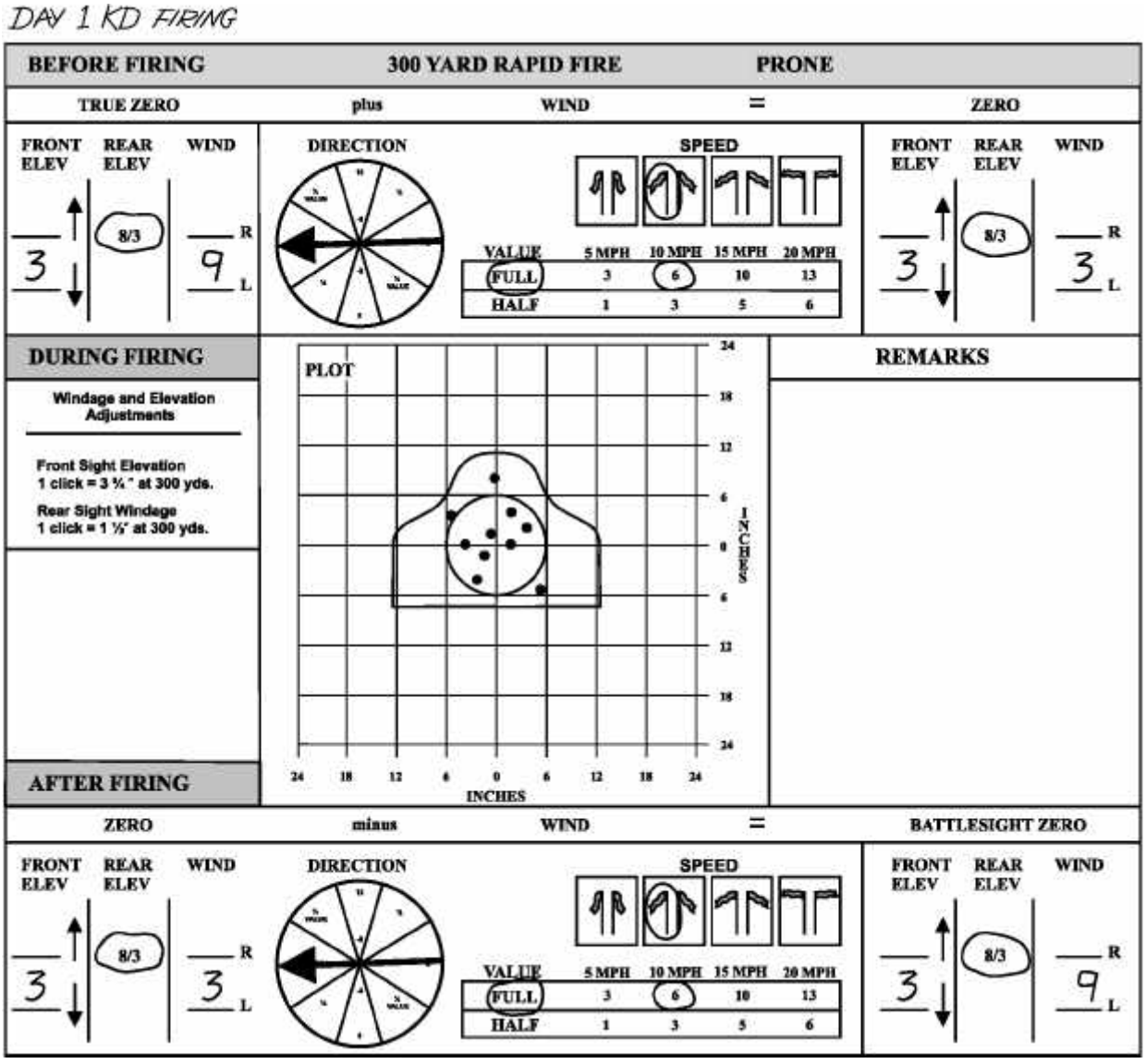


Figure A-4. Recording Data After Firing.

APPENDIX B

GLOSSARY

SECTION I. ACRONYMS

BZO. . . . . battlesight zero

CLP . . . . . .cleaner, lubricant, and preservative

KD. . . . . known distance

LAW . . . . . .lubricating oil, arctic weapons

NBC. . . . . nuclear, biological, and chemical

ROE. . . . . .rules of engagement

SOP . . . . . .standing operating procedures

TM. . . . . technical manual

SECTION II. DEFINITIONS

A

aiming point – The aiming point is the precise point where the tip of the front sight post is placed in relationship to the target.

alibi – Any condition caused by the weapon, ammunition, or range operation that causes the shooter not to have an equal opportunity to complete a string of fire as all other shooters on the range.

B

battlesight zero (BZO) – The elevation and windage settings required to engage point targets from 0-300 yards/meters under ideal weather conditions (i.e., no wind).

bone support – The body's skeletal structure supporting the rifle's weight.

breath control – Procedure used to fire the rifle at the moment of least movement in the body and the rifle.

C

canting – An angular deviation of the weapon to the left or right from a vertical position during firing.

center of mass – A point that is horizontally and vertically centered on the target.

center of mass hold – The placement of the tip of the front sight on the target center of mass prior to the shot breaking.

centerline of the bore – An imaginary straight line beginning at the chamber end of the barrel and proceeding out of the muzzle.

chamber check – Procedure used to determine a weapon's condition.

D

double feed – Attempted simultaneous feeding of two or more rounds from the magazine.

dry fire – Cocking, aiming, and squeezing the trigger of an unloaded rifle in order to practice the fundamentals of marksmanship.

detailed search – Method for conducting a systematic search of an area for specific target indicators.

E

eye relief – The distance between from the rear sight aperture to the aiming eye.

F

function check – Procedure used to ensure the selector lever operates properly.

flag method – Procedure used to determine wind velocity and direction on a Known Distance (KD) range.

field expedient battlesight zeroing – Process used to zero the rifle at 36 yards or 30 meters when a 300-yard/-meter range is not available.

G

gas operated – A self-loading firearm that utilizes the expanding force of the propellant's gases to operate the action of the weapon.

H

hasty search – Method for quickly searching an area for enemy activity.

hasty sight setting – A zero established for distances out to 800 yards/meters.

I

immediate threat target – A target engaged at a short range (50 meters or less) with little or no warning.

initial sight setting – Sight setting placed on a rifle that serves as the starting point from which all sight adjustments are made for the initial zeroing process.

L

limited technical inspection (LTI) – An inspection performed by an armorer on a weapon to determine its operational status (safety and function, not accuracy).

line of sight – An imaginary line extending from the shooter's eye through the rifle's sights and onto an aiming point on a target.

load – Command/Procedure used to take a weapon from Condition 4 to Condition 3 by inserting a magazine with rounds.

M

magazine – A container that holds ammunition in a position to be chambered.

magazine fed – A mechanical, automatic means of supplying a firearm with ammunition to be chambered.

make ready – Command/Procedure used to take a weapon from Condition 3 to Condition 1 by chambering a round.

muscular relaxation – The state of tension required to properly control the rifle. The shooter's muscles are in a relaxed state of control—tightened but not tensed.

N

natural point of aim – The location at which the rifle's sights settle if bone support and muscular relaxation are achieved.

O

observation method – Procedure used to determine wind velocity and direction in a tactical situation.

P

pie technique – A technique used to locate and engage targets from behind cover, while minimizing the Marines exposure to enemy fire.

R

range – 1. A designated place where live fire weapons training is conducted. **2.** The horizontal distance to which a projectile can be propelled to a specified target. **3.** The horizontal distance between a weapon and target.

recoil management – The ability to manage or control the recoil of the rifle for a given shooting position.

rollout – A technique used to locate and engage targets from behind cover, while minimizing the Marines exposure to enemy fire.

S

semiautomatic – One full cycle of operation. The firing, extraction, and ejection of the spent cartridge, the cocking of the weapon and chambering of the succeeding round of ammunition after the trigger is pulled.

shooter error — Any action induced by the shooter that causes the weapon to fail to operate properly or miss the intended target.

sight alignment – The placement of the tip of the front sight post in the center of the rear sight aperture.

sight picture — The placement of the tip of the front sight post in the center of the target while maintaining sight alignment.

sling – When properly attached to the rifle, the sling provides maximum stability for the weapon and helps reduce the effects of the rifle's recoil. Also used for individual weapon transport.

stability of hold – The ability to acquire a stable position and to hold the rifle steady for any given rifle position.

stock weld – The firm, consistent contact of the cheek with the weapon's buttstock.

stoppage – Any condition that causes the rifle to fail to fire.

T

target indicators – Anything that reveals the enemy's position.

trajectory – The path of a projectile through the air and to a target.

triangulation process – Process used to determine the vertical and horizontal sight adjustments that must be made to center a shot group.

trigger control – The skillful manipulation of the trigger that causes the rifle to fire without disturbing sight alignment or sight picture.

U

unload – Command/Procedure used to take a weapon from any condition to Condition 4.

unload and show clear – Command/Procedure used to take a weapon from any condition to Condition 4 while requiring a second individual to check the weapon to verify that no ammunition is present.

user serviceability inspection – Procedure used to ensure a weapon is in an acceptable operating condition, conducted by the shooter.

V

velocity – Speed at which the projectile travels.

W

weapons carry – Procedure used to effectively handle the rifle while remaining alert to possible threat levels.

weapons condition – Describes a weapon's readiness for live fire.

weapons transport – Procedure used to carry the rifle for long periods of time and when one or both hands are needed for other work.

windage and elevation rules – Rules that define how far the strike of the round will move on the target for each click of front and rear sight elevation or rear sight windage for each 100 yards/meters of range to the target.

Z

zeroing – The process used to adjust the rifle sights that cause it to shoot to point of aim at a desired range.

MCRP 3-01B

Pistol Marksmanship

U.S. Marine Corps

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Unless otherwise stated, whenever the masculine gender is used, both men and women are included.

DEPARTMENT OF THE NAVY
Headquarters United States Marine Corps
Washington, D.C. 20380-1775

25 November 2003

FOREWORD

Marines must have the versatility, flexibility, and skills to deal with any situation at any level of intensity across the entire range of military operations. Whenever the situation warrants the application of deadly force, a Marine must be able to deliver well-aimed shots to eliminate the threat. A Marine who is proficient in pistol marksmanship handles this challenge without escalating the level of violence or causing unnecessary collateral damage. It is not enough to simply provide Marines with the best available firearms; we must also ensure that their training prepares them to deliver accurate fire against the enemy under the most adverse conditions without hesitancy, fear, or uncertainty of action. A well-trained Marine is confident that he can protect himself, accomplish the mission, and protect his fellow Marines. To be combat ready, a Marine must be skilled in the tactics, techniques, and procedures of pistol marksmanship and diligent in the proper care and maintenance of the M9, 9-mm service pistol.

Marine Corps Reference Publication (MCRP) 3-01B, *Pistol Marksmanship*, is the Marine Corps' source document for pistol marksmanship and provides the doctrinal basis for Marine Corps pistol marksmanship training. This publication provides all Marines armed with a pistol with the tactics, techniques, and procedures for range and field firing the M9, 9-mm service pistol.

MCRP 3-01B supersedes the discussion of pistol marksmanship in Fleet Marine Force Manual (FMFM) 0-8, *Basic Marksmanship*.

Reviewed and approved this date.

BY DIRECTION OF THE COMMANDANT OF THE MARINE CORPS

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CHAPTER 1
THE M9 SERVICE PISTOL

The Marine Corps' uses the M9 service pistol as a defensive weapon. It is a semiautomatic, magazine-fed, recoil-operated, double-action pistol. The M9 service pistol's magazine holds 15 rounds and is chambered with a 9-mm ball (NATO M882 round). The M9 service pistol has a maximum effective range of 50 meters (54.7 yards).

Note: The procedures in this chapter are written for right-handed Marines; left-handed Marines reverse instructions as necessary.

Functional Capabilities

When the M9 service pistol's safety lever is moved to the firing position, it can be fired in either a single-action or double-action mode. It is designed to fire one round each time the trigger is pulled. When the last round is fired, the slide automatically locks to the rear.

Single-Action Mode

The single-action mode allows the pistol to be fired when the hammer is cocked; single action requires the hammer to be cocked to the rear before the trigger is pulled. The hammer can be manually cocked or mechanically cocked. The hammer is mechanically cocked after the first shot is fired. See figure 1-1.

Figure 1-1. Single-Action Mode.

Double-Action Mode

The double-action mode causes the hammer to move to the rear as the trigger is being pulled. See figure 1-2.

Figure 1-2. Double-Action Mode.

Nomenclature

See figure 1-3 on page 1-2.

Major Components

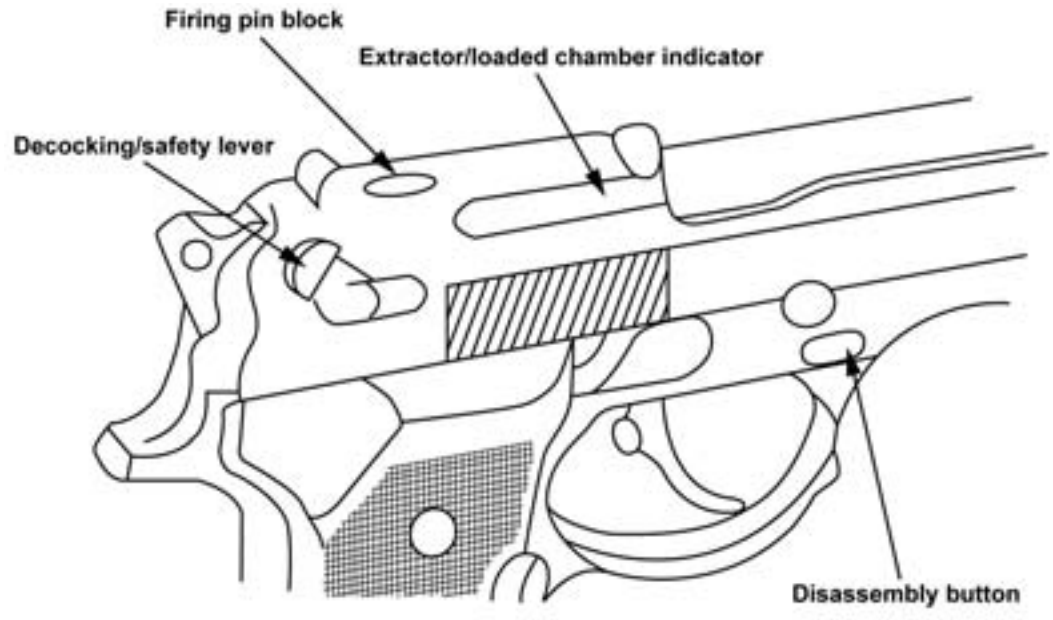
The M9's major components consist of the slide assembly, barrel assembly, and receiver. See figure 1-4 on page 1-3.

Slide Assembly

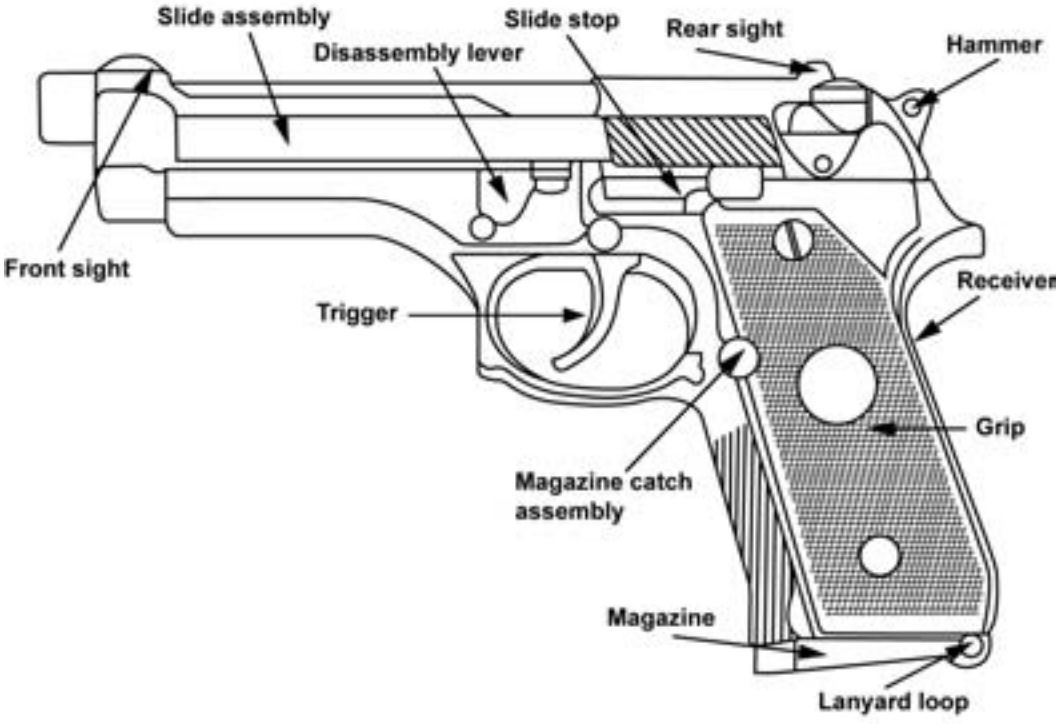
The slide assembly houses the firing pin, firing pin block, striker, extractor, and loaded chamber indicator, and it cocks the hammer during recoil.

Extractor

The extractor pulls the brass from the chamber after the round is fired.



Right Side View



Left Side View

Figure 1-3. M9 Service Pistol.

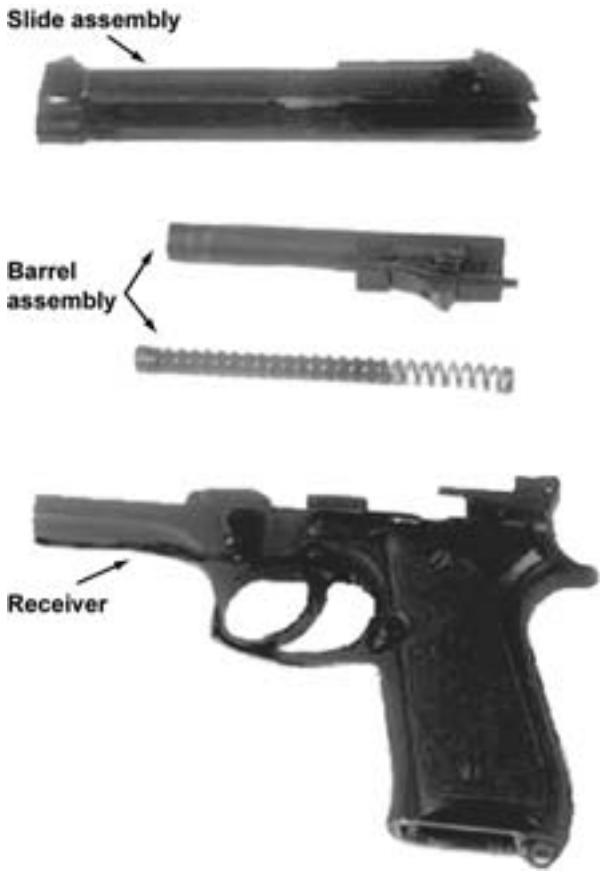


Figure 1-4. Major Components.

Loaded Chamber Indicator

When a round is in the chamber, the upper surface of the loaded chamber indicator protrudes from the right side of the slide. This protrusion can be felt with the finger, verifying that there is a round in the chamber.

Barrel Assembly

The barrel assembly houses the round for firing, directs the projectile, and locks the barrel in position during firing.

Receiver

The receiver supports the major components, controls the functioning of the pistol, and holds the magazine in place. The front and back straps of the grip are grooved vertically to ensure that the hand does not slip while firing. The receiver consists of the disassembly button, slide stop, and magazine catch assembly.

Disassembly Button

The disassembly button permits quick disassembly of the pistol.

Slide Stop

The slide stop holds the slide to the rear after the last round is fired. It can also be manually operated to lock the slide to the rear or release the slide.

Magazine Catch Assembly (Magazine Release Button)

The magazine catch assembly secures the magazine in place when loading, and it releases the magazine from the pistol when unloading. The magazine catch assembly is designed for both right- and left-handed Marines.

Note: Reversal of the magazine catch assembly for left-handed Marines can be performed by a qualified armorer.

Safety Features

The safety features of the M9 service pistol include the decocking/safety lever, firing pin block, and half-cock notch.

Decocking/Safety Lever

The decocking/safety lever, commonly referred to as the safety, permits safe operation of the pistol by both right- and left-handed Marines. As the safety is moved to the safe (down) position, the firing pin striker moves out of alignment with the firing pin. This movement prevents the pistol from firing as the hammer moves forward.

Note: In the fire (up) position, a red dot is visible, indicating that the pistol is ready to fire.

Firing Pin Block

The firing pin block rests in the firing pin notch and prevents movement of the firing pin until the trigger is pulled. As the trigger is pulled, the firing

pin block moves up and out of the firing pin notch. This movement allows a round to be fired when the hammer strikes the firing pin.

Half-Cock Notch

The half-cock notch stops the forward movement of the hammer during a mechanical failure.

Cycle of Operation

There are eight steps in the cycle of operation for the M9 service pistol.

Firing

Once the safety is off and the trigger is pulled to the rear, the hammer falls on the firing pin, which strikes the primer and ignites the round. See figure 1-5.

Figure 1-5. Firing.

Unlocking

As the slide assembly moves to the rear, the locking block rotates out of the notches in the slide. See figure 1-6.

Figure 1-6. Unlocking.

Extracting

As the slide moves rearward, the extractor withdraws the cartridge case out of the chamber. See figure 1-7.

Figure 1-7. Extracting.

Ejecting

As the face of the slide passes over the ejector, the case strikes the ejector and it is knocked upward and outward through the ejection port. See figure 1-8.

Figure 1-8. Ejecting.

Cocking

As the slide moves rearward, the hammer is pushed back, allowing the sear to engage the hammer hooks, cock the hammer to the rear, and place the pistol in the single-action mode. See figure 1-9.

Figure 1-9. Cocking.

Feeding

The slide starts forward, pushed by the recoil spring. The face of the slide makes contact with the cartridge at the top of the magazine, stripping it from the magazine and pushing it toward the chamber. See figure 1-10.

Figure 1-10. Feeding.

Chambering

As the slide continues forward, it pushes the cartridge into the chamber. See figure 1-11.

Figure 1-11. Chambering.

Locking

As the slide assembly continues to move forward, the locking block lugs move into the locking block recesses on the right and left sides of the slide. See figure 1-12 on page 1-6.

Figure 1-12. Locking.

Ammunition

The only ammunition authorized for the M9 service pistol is the NATO M882 9-mm ball. Dummy ammunition can be used during training (a dummy round has a hole drilled in its side and contains no primer). See figure 1-13.

Figure 1-13. M9 Service Pistol Ammunition.

Do not open ammunition containers until the ammunition is to be used. Ammunition must be maintained in a high state of readiness. To care for ammunition—

- Keep ammunition dry and clean. If ammunition gets wet or dirty, wipe it off with a clean dry cloth.
- Wipe off light corrosion as soon as it is discovered. Never use ammunition that is heavily corroded, dented, or has the projectile pushed in.
- Do not expose ammunition to direct sunlight for long periods of time.
- Do not oil or grease ammunition. Dust or other abrasives can collect on greasy ammunition and may cause damage to the operating parts of the pistol. Oiled cartridges also produce excessive chamber pressure.

Wearing of the M9 Service Pistol's Gear

The proper placement of pistol gear helps ensure safety and aids the Marine in effectively handling and employing the pistol.

M12 Holster

The M12 holster consists of the holster, removable holster flap, and metal retaining clip. To check for proper placement of the holster, allow the right arm to hang freely. The holster should be slightly in front of the arm to permit easy access to the pistol upon presentation from the holster. See figure 1-14.

Note: In most cases, the holster is issued with the holster flap installed for a right-handed Marine. To convert the holster for a left-handed Marine, remove the metal retaining clip and install the clip on the opposite side of the holster.

Figure 1-14. The M12 Holster and Ammunition Pocket.

M1 Ammunition Pocket

The ammunition pocket attaches to the cartridge belt on the side opposite the holster in a position that best permits ready access for reloads. The magazine is stored in the ammunition pocket with the rounds down and pointed inboard.

M7 Shoulder Holster

The M7 shoulder holster consists of a holster with a thumb snap closure, shoulder strap, chest strap, and a belt retaining loop. The holster is positioned on the left side of the chest to provide easy and quick access with the right hand. See figure 1-15. The M7 holster comes fully assembled and has adjustable straps to accommodate each Marine's body size. The holster is available for right-handed Marines only, therefore, a left-handed Marine has to withdraw the pistol from the holster with the right hand and then transfer the pistol to the left hand before firing. (See chap. 8 for transferring the pistol from one hand to the other.) When the shoulder holster is worn properly—

Figure 1-15. M7 Shoulder Holster.

- The shoulder strap lays flat across the left shoulder with the shoulder pad directly on top of the shoulder.
- The chest strap attaches to the D-ring at the top of the holster and runs diagonally across the chest, underneath the right arm, and around the back where it attaches to the end of the shoulder strap.
- The belt retaining loop is at the bottom of the holster and attaches to the belt to stabilize the holster's position.
- The ammunition pocket attaches to the chest strap directly underneath the right arm.

Assault Holster

Some Marines (i.e., Marine security force, direct action platoon, and military police) are required to carry the assault holster. This holster has a retention strap that fastens over the top of the holster to retain the pistol. This type of holster generally has a thumb break on the retention strap that is disengaged to access the pistol. See figure 1-16.

Figure 1-16. Assault Holster.

Concealed Pistol Holster

Some Marines are required to carry a concealed pistol as part of their official duties. The primary consideration for placement of a concealed pistol holster is to ensure the pistol cannot be seen; therefore, the Marine must consider the type of clothing to be worn. A secondary consideration is to place the holster so the pistol can be presented easily. Typically, the best position for a concealed holster is just behind the strong side hip. This position best conceals the pistol while allowing it to be presented quickly. Another placement choice is in a shoulder holster, placing the pistol just under the weak side arm. See figures 1-17 through 1-20 on pages 1-8 and 1-9.

Figure 1-17. Wearing of the Concealed Pistol Holster—Utilities.

Figure 1-18. Wearing of the Concealed Pistol—Sweater.

Figure 1-19. Wearing of the Concealed Pistol Holster—Jacket.

Figure 1-20. Wearing of the Concealed Pistol Holster—Civilian Attire.

Lanyard

The lanyard aids in pistol retention. It is issued in three sizes and is adjustable. The lanyard consists of a fabric cord, two cylindrical slip rings, and a metal clip that attaches the lanyard to the pistol's lanyard loop. See figure 1-21.

Figure 1-21. M9 Service Pistol (With Lanyard).

To don the lanyard—

- Adjust the slip rings so they are positioned flush with the lanyard's base (clip end).
- Place the right arm through the loop and place the loop over the head, resting on the left shoulder.
- Attach metal clip to the pistol's lanyard loop.
- Place the pistol in the holster.
- Use the left hand to hold the bottom slip ring against the base of the lanyard. Use the right hand to slide the top slip ring upward to position the loop of the lanyard under the arm. The lanyard should fit snugly against the body, but not restrict the Marine's movements.
- Tuck any excess cord behind the holster.
- Ensure that the lanyard is adjusted properly by removing the pistol from the holster and fully extending the right arm. The lanyard should be taut. Adjust as necessary.

  Note: Re-adjust the lanyard if any equipment changes are made (e.g., flak jacket).

Firing the M9 Service Pistol While Wearing Gloves

Not all combat engagements occur during ideal weather conditions. During cold weather, the Marine may find it necessary to wear gloves to protect the fingers from frostbite and help prevent stiffening of the hands. Gloves may also be worn in mission-oriented protective posture conditions. Gloves provide protection to the hands, however, they also may interfere with the Marine's ability to engage targets effectively. The added bulk of the gloves may affect the Marine's ability to manipulate the safety, magazine release button, magazine, hammer, and slide stop/release. For example, the Marine may need to exert more pressure to engage the magazine release or slide release buttons to compensate for the thickness of the gloves.

The principles of target engagement (see chap. 7) do not change while wearing gloves, however, the specific ability to manipulate and control the trigger is greatly affected by the thickness of the gloves around the fingers. Wearing gloves reduce the Marine's ability to feel, which makes it difficult to apply trigger control when firing. The Marine may find that more pressure than normal must be applied with the trigger finger just to establish initial contact with the trigger. Once the Marine can "feel" the trigger through the gloves, then the pressure required to fire a shot can be applied. This action may increase the chances of firing the pistol prematurely due to excessive pressure on the trigger. Dry firing while wearing gloves allows the Marine to learn how to apply trigger control consistently and determines how much pressure is needed to effectively fire a shot.

While wearing gloves, the Marine may find it difficult to fire the pistol in the double-action mode due to the position of the trigger and the limited amount of space between the trigger and the trigger guard. Therefore, if the situation permits, the Marine may wish to thumbcock the pistol to fire in single-action mode. In single-action mode, there is more space between the trigger guard and the trigger, making it easier to position the finger on the trigger. However, the Marine's ability to thumbcock the pistol may also be hindered by the gloves' bulk. Therefore, to thumbcock the pistol while wearing gloves, the Marine may perform one of the following methods:

- For method one, loop a section of 550 cord (approximately 2 inches) through the loop located on the top rear portion of the hammer. The length of the cord should not interfere with the pistol's cycle of operation or with the Marine's ability to establish sight alignment. Once the cord is attached to the hammer, take the pistol off safe and pull downward on the cord to cock the hammer. See figure 1-22.

Figure 1-22. Cocking the Pistol with 550 Cord.

- For method two, take the pistol off safe, rotate the pistol inboard, and place the top of the hammer against a secure surface (e.g., cartridge belt, table top, heel of boot). Apply pressure on the pistol to keep the hammer in place and push downward on the pistol in one continuous motion to cock the hammer. See figure 1-23.

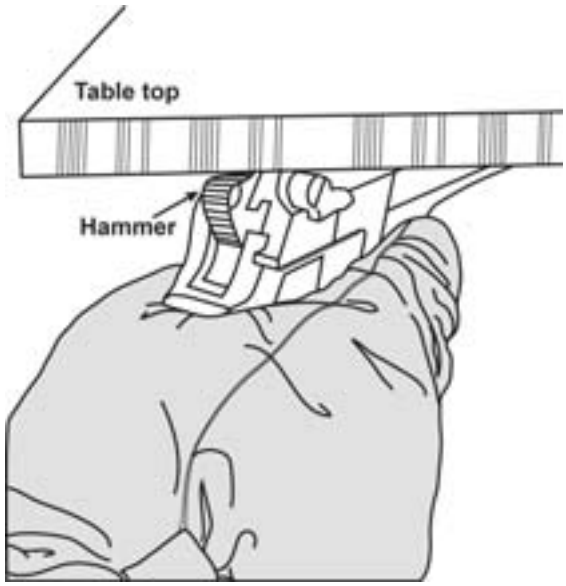


Figure 1-23. Cocking the Pistol on a Secure Surface.

Preventive Maintenance

If the M9 service pistol is to be effective, it must be maintained in a state of operational readiness at all times; therefore, maintenance of the M9 service pistol is a continuous effort. A clean, properly lubricated, well-maintained pistol will fire when needed.

Pistol Disassembly

Before disassembling the M9 service pistol, ensure that the pistol is in Condition 4. The pistol is in Condition 4 when the magazine is removed, the chamber is empty, the slide is forward, and the safety is on. To disassemble the pistol, perform the following steps in sequence:

- Hold the pistol in the right hand with the muzzle slightly elevated. Reach over the slide with the left hand and place the left index finger on the disassembly button and the left thumb on the disassembly lever. Press the disassembly

button and hold it in place while rotating the disassembly lever downward until it stops.

Note: A left-handed Marine places the right thumb on the disassembly button and the right index finger on the disassembly lever.

- Pull the slide and barrel assembly forward and remove it while wrapping the fingers around the slide to hold the recoil spring and recoil spring guide in place.
- Turn the slide assembly over in the left hand until the recoil spring and recoil spring guide face up. Place the right thumb on the end of the recoil spring guide next to the locking block and compress the recoil spring and spring guide while lifting and removing them from the slide and barrel assembly. See figure 1-24. Allow the recoil spring to decompress slowly.

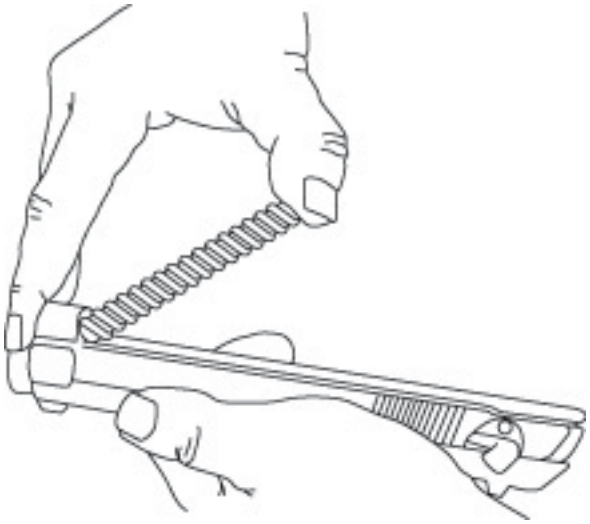


Figure 1-24. Removing the Recoil Spring and Recoil Spring Guide.

- Separate the recoil spring from the recoil spring guide.
- Push in on the locking block plunger with the right index finger while pushing the barrel forward slightly. Lift and remove the locking block and barrel assembly from the slide.

A Marine is not authorized to disassemble the pistol any further than the preceding steps. Any further disassembly must be performed by ordnance personnel. See figure 1-25.

Figure 1-25. Disassembled M9 Service Pistol.

Disassembly of the Magazine

To disassembly the magazine, perform the following steps:

- Grip the magazine firmly in the left hand with the floorplate up and the thumb resting against the flat end of the floorplate.
- Release the floorplate by pushing down (with a blunt object; e.g., an ink pen) on the floorplate retainer stud in the center of the floorplate. At the same time, slide the floorplate a short distance forward with the thumb.
- Maintain the magazine spring pressure with the thumb and remove the floorplate from the magazine.
- Remove the floorplate retainer and magazine spring and follower from the magazine tube.

See figure 1-26.

Figure 1-26. Disassembled Magazine.

Inspection of the Pistol

Once the pistol has been disassembled, it must be thoroughly inspected to ensure it is in a serviceable condition. Pistol inspection is continuous during the pistol's cleaning and reassembly:

Slide Assembly
- Check for free movement of the safety. Ensure the rear sight is secure.

Barrel Assembly
- Inspect the bore and chamber for pitting or obstructions.
- Check the locking block plunger for free movement of the locking block.
- Inspect the locking lugs for cracks and burrs.

Recoil Spring and Recoil Spring Guide
- Check the recoil spring for damage.
- Check that it is not bent.
- Check the recoil spring guide for straightness and smoothness.
- Check to be sure it is free of cracks and burrs.

Receiver Assembly
- Check for bends, chips, and cracks.
- Check for free movement of the slide stop and magazine catch assembly.
- Check the guide rails for excessive wear, burrs, cracks, or chips.

Magazine Assembly
- Check the spring and follower for damage.
- Ensure the lips of the magazine are not excessively bent and are free of cracks and burrs. The magazine tube should not be bent or dirty.

Cleaning and Lubricating the Pistol

Only authorized cleaning materials should be used to clean and lubricate the pistol. If these items are not issued with the pistol, they may be obtained from the armory. The following procedures are used to clean and lubricate the pistol—

Slide Assembly
- Clean the slide assembly with a cloth. A general purpose brush and cleaning lubricant protectant (CLP) can also assist in the removal of excess dirt and carbon buildup.
- Ensure the safety, bolt face, slide guides, and extractor are free of dirt and residue.
- Wipe dry with a cloth and apply a light coat of CLP.

Barrel Assembly
- Insert a bore brush with CLP into the chamber end of the barrel, ensuring that it completely clears the muzzle before it is pulled back through the bore.

Caution

Insert the bore brush through the chamber to prevent damage to the crown of the barrel.

- Repeat several times to loosen carbon deposits.
- Dry the barrel by pushing a swab through the bore.
- Repeat until a clean swab can be observed.
- Clean the locking block with a general purpose brush.
- Use the barrel brush to apply a light coat of CLP to the bore and chamber area and lubricate the exterior surfaces of the barrel and locking block.

Recoil Spring and Recoil Spring Guide
- Clean the recoil spring and recoil spring guide using CLP and a general purpose brush or cloth.
- Apply a light coat of CLP after wiping the recoil spring and recoil spring guide clean.

Receiver
- Wipe the receiver assembly clean with a cloth.
- Use a general purpose brush for areas that are hard to reach, paying special attention to the

disassembly lever, trigger, slide stop, hammer, and magazine release button.
- Apply a light coat of CLP.

Caution

Do not allow the hammer to fall with full force by pulling the trigger when the slide is removed. This can damage the receiver and hammer.

Magazine
- Clean the magazine tube and follower with CLP and a general purpose brush.
- Wipe the magazine spring, floorplate retainer, and floorplate clean with a cloth.
- Apply a light coat of CLP.

Pistol Re-assembly

After the M9 service pistol has been cleaned and lubricated, it must be properly re-assembled to ensure its serviceability. To re-assemble the M9 service pistol—

- Use the left hand to grasp the slide with the bottom facing up and the muzzle pointing toward the body. Use the right hand to grasp the barrel assembly with the locking block facing up. Use the index finger to push in the locking block plunger while placing the thumb on the base of the locking block.
- Insert the muzzle of the barrel assembly into the forward open end of the slide. At the same time, lower the rear of the barrel assembly by slightly moving the barrel downward. The locking block should fall into the notches of the slide assembly.
- Slip the recoil spring guide into the recoil spring.
- Insert the end of the recoil spring and recoil spring guide into the slide recoil spring housing. At the same time, compress the recoil spring and lower the spring guide until it is fully seated onto the locking block cutaway.
- Use the left hand to grasp the slide and barrel assembly, sights up, and wrap the fingers around the slide assembly to hold the recoil spring and guide in place. Align the slide assembly guide rails onto the receiver assembly guide rails.
- Push the slide rearward while pushing up on the slide stop with the thumb. Lock the slide to the rear while maintaining upward pressure on the slide stop. Rotate the disassembly lever upward. Listen for a click, an audible click indicates a positive lock.

Pistol Magazine Re-assembly

To re-assemble the magazine—

- Grip the magazine firmly in the left hand with the floorplate end up and the counting holes facing the Marine. Insert the follower into the magazine so the flat end of the follower is against the flat end of the magazine.
- Ensure the floorplate retainer is attached to the first curve of the bottom coil.
- Hold the spring upright with the right hand and insert the spring into the magazine tube so that the flat end of the floorplate retainer is against the flat end of the magazine.
- Push the magazine spring and floorplate retainer down with the right hand and hold it in place with the thumb of the left hand. Use the right hand to slide the floorplate over the side walls of the magazine until fully seated, which is indicated by an audible click.

Safety/Function Check

A safety/function check is performed after reassembling the M9 service pistol. Perform the following steps to ensure the pistol is operational:

- Ensure there is no ammunition in the chamber of the pistol.
- Ensure that the safety is in the safe position, then depress the slide stop, allowing the slide to return fully forward. At the same time, the hammer should fall to the full forward position.

- Pull and release the trigger. The firing pin block should move up and down but the hammer should not move.
- Place the safety in the fire position.
- Pull the trigger to check the double action. The hammer should cock and fall.
- Pull the trigger again and hold it to the rear. Use the fingers and thumb of the left hand to grasp the serrated sides of the slide just forward of the safety. Pull the slide to its rearmost position and release it while holding the trigger to the rear. Release the trigger, a click should be heard and the hammer should not fall.
- Pull the trigger to check the single action. The hammer should fall. Place the safety in the safe position.

If the safety/function check does not indicate an operational pistol, the Marine takes the pistol to organizational maintenance or the next authorized repair level.

User Serviceability Inspection

The Marine is responsible for performing a user serviceability inspection on the pistol prior to live fire. The user serviceability inspection ensures the pistol is in an acceptable operating condition. This inspection is not intended to replace the detailed pistol components inspection following disassembly or the limited technical inspection or pre-fire inspection conducted by a qualified armorer. To conduct a user serviceability inspection on the pistol, perform the following steps:

- Ensure the magazine release button is on the left side of the pistol for a right-handed Marine, the right side of the pistol for a left-handed Marine.
- Ensure the magazine seats into the magazine well when it is inserted and that it cannot be pulled out.
- Ensure the slide stays locked to the rear when the slide is pulled rearward with an empty magazine in the pistol.
- Ensure the magazine falls out freely when the magazine release button is depressed.
- Repeat the preceding four steps with the second magazine.
- Ensure the slide is locked to the rear before lubricating the spring guide, the top of the barrel just forward of the front sight, and the guide rails of the slide assembly behind the safety. With the muzzle pointed downward, work the slide several times and release.
- Inspect the pistol's external parts visually to ensure that there are no cracks or excessive wear.
- Perform a safety/function check of the pistol.

Pistol Maintenance in Adverse Conditions

Combat situations can place Marines in a variety of adverse conditions. Therefore, the M9 service pistol must be maintained properly to ensure its continued operation.

Extreme Cold

In extreme cold conditions, ensure that the following maintenance is performed:

- Clean and lubricate the pistol inside at room temperature, if possible.
- Apply a light coat of lubricant, arctic weather (LAW) to all functional parts.
- Always keep the pistol dry.
- Keep the pistol covered when moving from a warm to a cold area. This permit gradual cooling of the pistol and prevents freezing.
- Ensure that a hot pistol is not placed in snow or on ice.
- Keep snow out of the bore of the barrel. If snow should enter the bore, use a swab and cleaning rod to clean the bore before firing.

Hot, Wet Climates

Maintenance in hot, wet climates must be performed more frequently:

- Inspect hidden surfaces for corrosion. If corrosion is found, clean and lubricate.
- Remove handprints with a clean cloth in order to prevent corrosion.
- Dry the pistol with a cloth and lubricate it with CLP.
- Check ammunition and magazines frequently for corrosion. Disassemble and clean the magazines with CLP and wipe dry with a clean cloth. If necessary, clean ammunition with a dry cloth.

Hot, Dry Climates

In a hot, dry climate, dust and sand can cause stoppages and excessive wear on component contact surfaces during firing; therefore, keep the pistol covered whenever possible.

Corrosion is less likely to form on metal parts in a dry climate. Therefore, lightly lubricate internal working surfaces with CLP. Do not lubricate external parts of the pistol. Wipe excess lubricant from exposed surfaces. Do not lubricate internal components of the magazine.

Heavy Rain and Fording Operations

The following maintenance procedures are followed during periods of heavy rains or during fording operations:

- Always attempt to keep the pistol dry.
- Drain any water from the barrel prior to firing.
- Dry the bore with a swab and cleaning rod.
- Generously lubricate internal and external surfaces of the pistol with CLP.

Amphibious Conditions

If the pistol comes into contact with salt water, clean the pistol as soon as possible. If time does not permit cleaning in accordance with Technical Manual (TM) 1005A-10/1, *Operator's Manual, Pistol Semiautomatic, 9mm, M9*, then wash the pistol with fresh water

CHAPTER 2
WEAPONS HANDLING

Weapons handling is a method of providing consistent and standardized procedures for handling, operating, and employing the M9 service pistol. Understanding and applying the principles of weapons handling are critical to developing safe and consistent weapons skills. Strict adherence to training and diligent practice will make weapons handling instinctive. Mission accomplishment and survival during combat depend on a Marine's ability to react instinctively and with confidence.

Note: The procedures in this chapter are written for right-handed Marines; left-handed Marines should reverse directions as needed.

Safety Rules

The following safety rules are the foundation for responsible weapons handling. They must be observed at all times, both in training and combat.

Safety Rules

Rule 1: Treat every weapon as if it were loaded.
This rule is intended to prevent unintentional injury to personnel or damage to property from handling or transferring possession of a weapon.

Rule 2: Never point a weapon at anything you do not intend to shoot.
This rule enforces the importance of muzzle awareness and reinforces positive identification of the target.

Rule 3: Keep your finger straight and off the trigger until you are ready to fire.
This rule is intended to minimize the risk of firing the weapon negligently (when not firing, the trigger finger is straight along the receiver, outside of the trigger guard). This rule also reinforces positive identification of the target.

Rule 4: Keep weapon on safe until you intend to fire.
This rule enforces the use of the weapon's own safety feature and reinforces positive identification of the target.

Weapons Conditions

The M9 service pistol's level of readiness is defined by three specific conditions. The steps in the loading and unloading process take the pistol through the specific conditions that indicate the pistol's readiness for live fire. The Marine must understand and know the condition of his pistol at all times.

Condition 1. Magazine inserted, round in chamber, slide forward, and safety on.

Condition 2. Not applicable to the M9 service pistol.

Condition 3. Magazine inserted, chamber empty, slide forward, and safety on.

Condition 4. Magazine removed, chamber empty, slide forward, and safety on.

Determining a Weapon's Condition

There are two methods for determining the pistol's condition: checking the round indicator on the right side of the pistol and conducting a chamber check.

Checking the Round Indicator

When there is a round in the chamber, the upper surface of the extractor protrudes from the right side of the slide. The protrusion can be felt by sliding either the thumb or the index finger of the left hand over the top of the slide and across the extractor. See figure 2-1.

Conducting a Chamber Check

To conduct a chamber check—

- Point the pistol in a safe direction and grasp the pistol grip with the right hand.

Figure 2-1. Checking the Round Indicator.

- Place the trigger guard in the palm of the left hand. Use the thumb and index finger to grasp the forward end of the slide at the indentations under the front sight, behind the muzzle. See figure 2-2.

Figure 2-2. Placement of the Left Hand.

Caution

Ensure the muzzle does not cover the hand or fingers.

- Keep thumb in place around the pistol's backstrap and rotate fingers of the right hand over the top of the slide in front of the rear sight.
- Pull the slide to the rear by pushing forward with the right thumb and pulling back on the rear sight with the fingers. Use the left hand to steady the pistol and to assist in pulling the slide to the rear.
- Use the right hand to hold the slide to the rear (just enough to visually inspect the chamber for a round). Physically check for a round by inserting a finger of the right hand into the chamber area. See figure 2-3.

Figure 2-3. Chamber Check.

Note: At night or in low light conditions, the Marine's visibility is reduced; therefore, the Marine will have to rely on the physical check with the finger to determine if a round is in the chamber.

Caution

Pulling the slide too far to the rear while inspecting the chamber may cause a double feed or the ejection of a round.

- Remove the finger from the chamber and release tension on both hands to allow the slide to go forward. Ensure that the slide is all the way forward.

Weapons Commands

Weapons commands direct the Marine to safely load, unload, and employ the M9 service pistol. Six commands are used in weapons handling:

"*Load*"
This command is used to take a weapon from Condition 4 to Condition 3.

"*Make Ready*"
This command is used to take a weapon from Condition 3 to Condition 1.

"*Fire*"
This command is used to engage targets.

"*Cease Fire*"
This command is used to cease target engagement.

"*Unload*"
This command is used to take a weapon from any condition to Condition 4.

"*Unload, Show Clear*"
This command is used to require a second individual to check the weapon to verify that no ammunition is present before the weapon is put into Condition 4.

Side View

Front View

Figure 2-4. Indexing the Magazine.

Loading the Pistol

Perform the following steps to load the pistol (take the pistol from Condition 4 to Condition 3):

- Ensure the pistol is on safe.
- Use the right hand to grip the pistol grip firmly. Ensure that the pistol is pointed in a safe direction, bring the trigger guard to the right of eye level and cant the pistol so the magazine well faces inboard at approximately a 45-degree angle to the deck. Draw the right elbow in to facilitate control of the pistol.
- Use the left hand to remove a filled magazine from the ammunition pocket. Index the magazine by sliding the index finger along the forward edge of the magazine. See figure 2-4.
- Insert the filled magazine into the magazine well by guiding it with the index finger and, with the fingers extended, pushing it in with the heel of the hand until it is fully seated. Do not relinquish contact with the magazine until it is fully seated. See figure 2-5.

Figure 2-5. Seating the Magazine.

Making the Pistol Ready

Perform the following steps to take the pistol from Condition 3 to Condition 1:

- Firmly grip the pistol grip with the right hand. Ensure that the pistol is pointed in a safe direction and the slide is in its forward position.
- Rotate the magazine well outboard to facilitate pulling the slide to the rear. With the fingers and thumb of the left hand, grasp the serrated sides of the slide just forward of the safety. See figure 2-6.

Caution

Ensure the muzzle does not cover the hand or fingers.

- Pull the slide to its rearmost position by pushing forward with the right hand while pulling back on the slide with the left hand.
- Release the slide, this strips a round from the magazine and chambers it as the slide moves forward.
- Ensure the pistol remains on safe.
- Conduct a chamber check to ensure a round is in the chamber.

Note: A chamber check may be conducted at any time to check the pistol's condition.

Fire

Perform the following steps to fire the pistol:

- Keep trigger finger straight and use the right thumb to take the pistol off safe.
- Place the trigger finger on the trigger and apply pressure to the trigger until the shot is fired.

Right Side View

Left Side View

Figure 2-6. Grasping the Slide to Make Ready.

Cease Fire

Perform the following steps to execute a cease fire of the pistol:

- Remove the finger from the trigger and place it straight along the receiver.
- Place the pistol on safe without breaking the grip of the right hand.
- Assume a carry or transport position.

Unloading the Pistol

Perform the following steps to take the pistol from any condition to Condition 4:

- Use the right hand to grip the pistol firmly. Ensure that the pistol is on safe.
- Rotate the pistol so the magazine well is pointed inboard and angled down.

  Note: The angle of the magazine well must allow the magazine to fall freely from the well once the magazine release button is engaged.

- Depress the magazine release button to remove the magazine from the pistol. Catch the magazine with the left hand and retain it.
- Push upward on the slide stop with the right thumb and maintain pressure. Rotate the weapon so the chamber is outboard.

  Note: A left-handed Marine pushes upward on the slide stop with the left index finger.

- Reach over the top of the pistol with the left hand and grasp the slide serrations with the thumb and index finger. The left hand should partially cover the ejection port so it is positioned to catch an ejected round.
- Point the pistol in a safe direction and fully retract the slide and lock it to the rear. At the same time, catch the ejected round with the left hand. See figure 2-7.

Side View

Front View

Figure 2-7. Catching the Ejected Round.

- Rotate the pistol so the inside of the chamber can be seen. Visually inspect the chamber to ensure it is empty.
- Press the slide stop to release the slide and observe it going forward on an empty chamber.

Unloading and Showing the Pistol Clear

Perform the following steps to take the pistol from any condition to Condition 4. See figure 2-8.

Figure 2-8. Unload, Show Clear.

- Use the right hand to grip the pistol firmly. Ensure that the pistol is on safe.
- Rotate the pistol so the magazine well is pointed inboard and angled down.

  Note: The angle of the magazine well must allow the magazine to fall freely from the well once the magazine release button is engaged.

- Depress the magazine release button to remove the magazine from the pistol. Catch the magazine with the left hand and retain it.
- Push upward on the slide stop with the right thumb and maintain pressure. Rotate the weapon so the chamber is outboard.

  Note: A left-handed Marine pushes upward on the slide stop with the left index finger.

- Reach over the top of the pistol with the left hand and grasp the slide serrations with the thumb and index finger. The left hand should partially cover the ejection port so it is positioned to catch an ejected round.
- Point the pistol in a safe direction and fully retract slide and lock it to the rear. At the same time, catch the ejected round with the left hand.
- Rotate the pistol so the inside of the chamber can be seen. Visually inspect the chamber to ensure it is empty.
- Bring the pistol to the administrative transport and have another Marine visually inspect the chamber to ensure that—
  - The chamber is empty, no ammunition is present, and the magazine is removed.
  - The pistol is on safe.
- Acknowledge that the pistol is clear.
- Press the slide stop to release the slide and observe it going forward on an empty chamber.

Emptying the Magazine

Once the pistol is unloaded, the pistol magazine can be emptied of ammunition. To empty the magazine, perform the following steps:

- Hold the magazine upright with the back of the magazine tube against the palm of the hand.
- Push the top round forward with the thumb and catch it with the other hand as it is removed.
- Repeat until the magazine is empty.

Filling the Magazine

Prior to loading the pistol, the pistol magazine must be filled with the prescribed number of

rounds of ammunition. See figure 2-9. To fill the magazine, perform the following steps:

Figure 2-9. Filling the Magazine.

- Hold the magazine with the back of the magazine against the palm of the hand and the follower up.
- Use the other hand to place a round (primer end first) on the follower in front of the magazine lips.
- Press down on the round and slide the round completely back under the lips. The thumb or finger may push down on the back of the round to assist movement. The base of the round should be flush with the back of the magazine.

Repeat this procedure until the magazine is filled with the appropriate number of rounds. Holes on the back of the magazine allow the visual counting of rounds in five-round increments.

Reloading the Pistol

The Marine's ability to reload the pistol quickly improves his chance for success on the battlefield.

Dry Reload

A dry reload is conducted when the pistol runs out of ammunition during engagement and the slide locks to the rear. See figure 2-10. Perform the following steps to conduct a dry reload with the slide locked to the rear:

Note: The pistol is not placed on safe during a dry reload; the trigger finger is taken out of the trigger guard and placed straight along the side of the receiver.

- Seek cover, if the situation permits.

Figure 2-10. Pistol Ran Dry of Ammunition.

- Retain the firing grip with the right hand and pull the pistol in close to the body to facilitate control. Bring the trigger guard to the right of eye level and cant the pistol so the magazine well is facing inboard at approximately a 45-degree angle to the deck. See figure 2-11.

Figure 2-11. Bring the Pistol Toward the Body.

- Press the magazine release button and let the empty magazine fall to the deck. At the same time, unfasten the ammunition pocket to withdraw a filled magazine. See figure 2-12.

  Note: The primary objective during a dry reload is to get the pistol back in action as quickly as possible. Following engagement, retrieve the magazine before moving.

- Grasp the magazine by curling the middle finger and thumb of the left hand around the base of the magazine, with the index finger straight along the ammunition pocket. See figure 2-13.

Figure 2-12. Release Magazine and Unfasten Ammunition Pocket.

Figure 2-13. Grasping the Magazine.

- Index the magazine: as the magazine is being withdrawn from the pocket, the index finger should be along the front of the magazine. See figure 2-14.

Figure 2-14. Indexing the Magazine.

- Rotate the hand up so the magazine is aligned with the magazine well.
- Glance quickly at the magazine well, insert the magazine into the magazine well (see fig. 2-15).

Figure 2-15. Glance at the Magazine Well.

- Bring the eyes back on target at the same time as the heel of the left hand seats the magazine, do not relinquish contact with the magazine. See figure 2-16.

Figure 2-16. Seating the Magazine.

- Roll both hands inward to establish a two-handed grip and press the slide release with the left thumb to allow the slide to move forward, chambering the first round, and present the pistol to the target. See figure 2-17.

Note: A left-handed Marine presses the slide release with his trigger finger.

Figure 2-17. Present Pistol Back to Target.

Figure 2-18. Facilitating Control of Pistol.

Condition 1 Reload

In a Condition 1 reload, a partially-filled magazine is removed from the pistol and replaced with a fully filled magazine. A Condition 1 reload is performed when there is a lull in the action or whenever deemed necessary by the Marine. To perform a Condition 1 reload—

- Retain the firing grip with the right hand and pull the pistol in close to the body to facilitate control. Keep the pistol pointed in the direction of the likely threat. See figure 2-18.
- Withdraw a filled magazine from the ammunition pocket with the left hand. Index the magazine and bring it up to the left of eye level. See figure 2-19.

Figure 2-19. Withdrawing and Indexing a Filled Magazine.

- Slide the index finger to the side of the magazine to grasp the magazine between the index and middle fingers. See figure 2-20.

Figure 2-20. Grasping a Filled Magazine.

- Raise the pistol and bring the trigger guard to the right of eye level and cant the pistol so that the magazine well is facing inboard at approximately a 45-degree angle to the deck.

  Note: The angle of the magazine well must allow the magazine to fall freely from the well once the magazine release button is engaged.

- Press the magazine release button with the right thumb to eject the partially-filled magazine from the magazine well. Grasp the magazine between the index finger and thumb. See figure 2-21.

Figure 2-21. Removing a Partially-Filled Magazine.

- Insert the filled magazine into the magazine well (see fig. 2-22). Use the heel of the hand to ensure it is fully seated (see fig. 2-23).

Figure 2-22. Inserting a Filled Magazine.

Figure 2-23. Seating a Filled Magazine.

- Lower the pistol and point it in the direction of the likely threat.

If time permits, examine the partially-filled magazine to determine the number of rounds remaining. Stow the partially-filled magazine in the ammunition pocket for later use.

Reloading Considerations

If possible, take cover before reloading. Always reload before leaving cover to take advantage of the protection.

When reloading, the first priority is to reload the pistol quickly so that it is ready to fire. During a reload, the Marine focuses on reloading only—not on the enemy.

The next priority is for the Marine to retain the magazine during the reload. However, the combat situation may dictate dropping the magazine to the deck when performing a reload (i.e., dry reload). If time permits (i.e., Condition 1 reload), the Marine picks the magazine up or secures the magazine (e.g., ammunition pocket, flak jacket) before moving to another location.

Remedial Action

The M9 service pistol is an effective and extremely reliable weapon. Proper care and preventive maintenance usually ensures the pistol's serviceability. However, stoppages, while infrequent, do occur. To keep the pistol in action, stoppages must be cleared as quickly as possible through remedial action. A malfunction cannot be corrected through remedial action by the Marine.

Stoppage

A stoppage is an unintentional interruption in the cycle of operation; e.g., the slide not moving forward completely. A stoppage is normally discovered when the pistol will not fire. Most stoppages can be prevented by proper care, cleaning, and lubrication of the pistol.

Many stoppages of the M9 service pistol are caused by shooter error. The Marine must be aware of shooter-induced stoppages in order to avoid them or to quickly identify and correct the stoppage and return the pistol to action. In a shooter-induced stoppage, the Marine—

- Fails to make ready.
- Fails to take the pistol off safe prior to firing.
- Engages safety while firing.
- Engages magazine release button while firing.
- Engages slide stop while firing (particularly prevalent when firing with an Isosceles grip).
- Fails to reset the trigger.
- Fails to recognize the pistol has run dry and the slide has locked to the rear.

Malfunction

A malfunction is a failure of the pistol to fire satisfactorily or to perform as designed (e.g., a broken front sight that does not affect the functioning of the pistol). A malfunction does not necessarily cause an interruption in the cycle of operation. When a malfunction occurs, the pistol must be repaired by an armorer.

Remedial Action

There is no one set of procedures (i.e., immediate action) that can be performed to clear all or even most of the stoppages that can occur with the M9 service pistol. Therefore, remedial action requires investigating the cause of the stoppage, clearing the stoppage, and returning the pistol to operation. When performing remedial action, the Marine should seek cover if the tactical situation permits. Once a pistol ceases to fire, the Marine must visually or physically observe the pistol to identify the problem before it can be cleared:

Note: The steps taken to clear the pistol are based on what is observed.

- Remove the finger from the trigger and place it straight along the receiver.
- Bring the pistol in close to the body and in a position to observe the chamber.
- Pull the slide to the rear while observing the chamber area to identify the stoppage. See figure 2-24 on page 2-14.

Note: Ensure the pistol does not move to safe when pulling the slide to the rear.

Figure 2-24. Observing Chamber.

- Correct the stoppage:
  - If there is a round in the magazine but not in the chamber (see fig. 2-25), the slide is released and a round is observed being chambered.

Figure 2-25. Round in Magazine but Not in Chamber.

  - If a round being chambered is not observed, the bottom of the magazine is tapped to seat it properly, and the slide is racked to the rear. See figure 2-26.
  - If there is no round in the magazine or chamber, a reload is conducted. See figure 2-27.

Figure 2-26. Round Not Being Chambered.

Figure 2-27. No Round in Magazine or Chamber.

- Fire the pistol.

Audible Pop or Reduced Recoil

WARNING

When an audible pop or reduced recoil is experienced, the Marine DOES NOT perform remedial action unless he is in a combat environment. An audible pop occurs when only a portion of the propellant is ignited. It is normally identifiable by reduced recoil and the pistol will not cycle. Sometimes, it is accompanied by excessive smoke escaping from the chamber area.

Training Environment

If an audible pop or reduced recoil is experienced during firing, cease fire immediately. Do not apply remedial action; instead, perform the following steps:

- Remove the finger from the trigger and place it straight along the receiver.
- Point the pistol down range.
- Place the pistol on safe.
- Raise a hand to receive assistance from available range personnel.

Combat Environment

The tactical situation may dictate correction of an audible pop or reduced recoil. To clear the pistol, perform the following steps:

- Remove the finger from the trigger and place it straight along the receiver.
- Seek cover if the tactical situation permits.
- Unload the pistol, but leave the slide locked to the rear.
- Insert something into the bore and clear the obstruction.
- Observe the barrel for cracks or bulges.
- Reload the pistol.

Weapons Carries

As the threat level increases, so should the Marine's readiness for engagement. Weapons carries are designed to place the Marine in a state of increased readiness as the threat level increases. There are two carries with the pistol: the Alert and the Ready. The carries permit quick engagement when necessary.

Alert

The Alert is used when enemy contact is likely (probable). See figure 2-28. The Marine performs the following steps to assume the Alert:

Figure 2-28. Alert.

- Ensure the pistol is on safe.
- Grasp the pistol grip firmly with two hands. The trigger finger is straight and the right thumb is on the safety and in a position to

- Extend the arms down at approximately a 45-degree angle to the body or bend the elbows. See figure 2-29.
- The muzzle of the pistol is pointed in the likely direction of the threat.

Ready

The Ready is used when there is no target, but contact with the enemy is imminent. The Marine performs the following steps to assume the Ready (see fig. 2-30):

- Ensure the pistol is on safe.
- Grasp the pistol firmly with two hands. The trigger finger is straight and the right thumb is on the safety and in a position to operate it.
- Extend arms and raise the pistol to just below eye level so a clear field of view is maintained.
- Point the muzzle of the pistol in the direction of enemy contact.

Weapons Transports

The M9 service pistol is transported in either the holster transport or the administrative transport.

Holster Transport

The holster transport is the most common method of carrying the pistol because it can be transported safely in the holster. This transport is used when there is no immediate threat (enemy contact is remote). See figure 2-31. To transport the pistol in the holster:

- Point the pistol in a safe direction.

WARNING

Ensure the pistol is pointed in a safe direction at all times and does not cover any part of the body while holstering.

Figure 2-29. Alert—Close Quarters.

Figure 2-30. Ready.

Figure 2-31. Holster Transport.

Figure 2-32. Administrative Transport.

- Ensure that the safety is on, the slide is forward, and the trigger finger is straight.
- Use the right hand to firmly grip the pistol grip and place the pistol in the holster:
  - Lift the flap of the holster with the left hand.
  - Look down at the holster, bring the pistol back to a position above the holster, and rotate the muzzle down into the holster.
- Push the pistol snugly into the holster and fasten the flap with the right hand.

Administrative Transport

The administrative transport is used to transport the pistol when the Marine does not have a holster. See figure 2-32. The Marine performs the following steps to assume the administrative transport:

- Establish a firm grip around the pistol grip with the right hand.
- Ensure the pistol is on safe, the magazine is removed, the slide is locked to the rear, and the trigger finger is straight along the receiver.
- Bend the elbow to approximately a 45-degree angle so the pistol is positioned near shoulder level. The wrist should be straight so the pistol's muzzle points up.

Combat Mindset

In a combat environment, the Marine must be constantly prepared to engage targets. When a target presents itself, there may be little time to react. The target must be engaged quickly and accurately. It is not enough to simply know marksmanship techniques, the Marine must be able to react instinctively.

The development of a combat mindset can be associated with the carries and holster transport for the pistol. The use of each carry/transport is dictated by the perceived level of threat. Each carry and transport should signify a stage of mental and physical preparedness for combat. The intensity of the Marine's mental and physical preparation depends on the likelihood of enemy contact.

Physical and Mental Preparation

Physical Preparation

In combat, targets can present themselves without warning. Therefore, it is essential for the Marine to maintain proper balance and control of the pistol at all times so that the pistol can be presented quickly and the target engaged accurately.

Speed alone does not equate to effective target engagement. The Marine should fire only as fast as he can fire accurately, never exceeding his physical ability to apply the fundamentals of marksmanship. To be effective in combat, the Marine must train to perfect the physical skills of shooting so they become second nature. The more physical skills that can be performed automatically, the more concentration that can be given to the mental side of target engagement.

Mental Preparation

While combat is unpredictable and constantly changing, the Marine can prepare mentally for the contingencies of the operational setting and confrontation with a threat. The stress of combat, coupled with the limited time available to engage targets, requires concentration on the mental aspects of target engagement; e.g., identification of targets, shoot/no-shoot decisionmaking, and the selection and use of cover. Minimizing stress and maximizing the limited time available to engage targets can be accomplished by—

- Knowing the combat environment and being constantly aware of the surroundings (e.g., terrain, available cover, possible threats) enables the Marine to quickly present the pistol and accurately engage targets.
- Identifying and evaluating possible courses of action and developing potential plans for target engagement that will be appropriate to the combat situation.
- Instilling confidence in a Marine's ability to fire well-aimed shots in the stress of a combat situation. A key factor in a Marine's level of confidence is the degree to which he has mastered the tactics, techniques, and procedures of pistol marksmanship.

Threat Levels

No Immediate Threat

When there is no immediate threat, the Marine assumes the holster transport. The pistol should be in Condition 1. This is the lowest level of awareness for the Marine in a combat environment, but the Marine must stay alert and aware of any nearby activity. To prepare for target engagement at this level, the Marine must—

- Be aware of likely areas of enemy contact.
- Be aware of the condition of his pistol.
- Establish a plan or course of action to present the pistol to a target should a target appear.
- Mentally review appropriate actions such as reloading and remedial action.

Contact Likely (Probable)

If enemy contact is likely (probable), the Marine assumes the Alert. When enemy contact is likely, the Marine should—

- Expect enemy contact and be constantly prepared to present the pistol.
- Search the entire area for indications of enemy targets and for suitable terrain features that offer cover and concealment. The Marine should avoid restricting the search to a single terrain feature because this hinders awareness to a sector of the battlefield and to approach by the enemy.
- Be mentally prepared for contact. Plan a course of action for immediate response to a target. Modify the plan of action as needed.

- Be physically prepared to fire. Maintain proper balance at all times. Avoid self-induced physical fatigue. For example, do not grip the pistol so tightly that fingers, hands, and arms tire from carrying the pistol.

Contact Imminent

When contact with an enemy target is imminent, assume the Ready. In this carry, the Marine is at the highest level of awareness and is constantly searching for and expecting a target. To fire well-aimed shots upon target detection, the Marine must be at the peak of his mental preparation, all distractions must be eliminated, and his focus must be on firing an accurate shot. In the Ready, the Marine must—

- Keep the pistol oriented in the general direction of observation (eyes, muzzle, target).
- Maintain a clear field of view above the pistol sights until the target is detected.
- Be mentally and physically prepared to engage the target. The Marine must be ready to:
  - Identify the target.
  - Sweep the safety.
  - Apply the fundamentals of marksmanship.
- Move only as fast as he is capable of delivering well-aimed shots, ensuring that speed of engagement does not exceed his physical abilities.
- Search the entire area for indications of enemy targets, lowering the pistol enough to observe a clear field of view of the area.

Transferring the Pistol

The Marine's ability to transfer a pistol to another Marine is critical to safe weapons handling. There are two methods for transferring the pistol from one Marine to another: show clear transfer and condition unknown transfer. Each transfer is performed based on the operational environment/ combat situation.

Show Clear Transfer

To transfer the pistol—

- Grasp the pistol firmly in the right hand while ensuring that the pistol is on safe.
- Remove and retain the magazine.
- Lock the slide to the rear and catch the round if there is a round in the chamber.
- Inspect the chamber visually to ensure it is empty and leave the slide locked to the rear. To transfer the pistol—
  - If the receiving Marine is to the right: Cradle the trigger guard in the palm of the left hand and wrap the fingers around the top of the pistol. Release the firing grip.
  - If the receiving Marine is to the left: With the left hand, grasp the slide of the pistol with the thumb over the slide and the fingers underneath. Release the firing grip.
- Ensure that the muzzle points up at a 45-degree angle in a safe direction and the chamber exposed. Hand the pistol to the other Marine, grip first. See figure 2-33.

Figure 2-33. Show Clear Transfer.

- The receiving Marine—
  - Grasps the pistol grip with the trigger finger straight along the receiver.
  - Inspects the chamber visually to ensure it is empty.
  - Ensures the pistol is on safe.

Condition Unknown Transfer

To transfer the pistol—

- Grasp the pistol firmly in the right hand while ensuring that the pistol is on safe. To transfer the pistol—
  - If the receiving Marine is to the right: Cradle the trigger guard in the palm of the left hand and wrap the fingers around the top of the pistol. Release the firing grip. See figure 2-34.

Figure 2-34. Condition Unknown Transfer to the Right.

  - If the receiving Marine is to the left: With the left hand, grasp the slide of the pistol with the thumb over the slide and the fingers underneath. Release the firing grip. See figure 2-35.

Figure 2-35. Condition Unknown Transfer to the Left.

- Ensure that the muzzle points up at a 45-degree angle in a safe direction. Hand the pistol to the receiving Marine, grip first.
- The receiving Marine—
  - Grasps the pistol grip with the trigger finger straight along the receiver.
  - Ensures the pistol is on safe.
  - Conducts a chamber check to determine the condition of the pistol.
  - Remove the magazine and count the number of rounds in the magazine by using the counting holes, if time permits. Re-insert the magazine into the magazine well ensuring it is fully seated.

CHAPTER 3
FUNDAMENTALS OF PISTOL MARKSMANSHIP

The fundamentals of pistol marksmanship are aiming, trigger control, and breath control. Understanding and applying the basic pistol marksmanship fundamentals ensures the Marine's effectiveness in target engagement. The fundamentals must be continually studied and practiced because they are the means by which accurate shots are placed on target. A Marine with a solid foundation in the fundamentals of marksmanship will be successful in the application of these fundamentals during combat.

Aiming

Maintaining the correct relationship between the pistol sights is essential for accurate target engagement. Because of the short distance between the pistol sights, a small error in their alignment causes a considerable error at the target.

Sight Alignment

Sight alignment is the relationship between the front sight and rear sight with respect to the aiming eye. Correct sight alignment is the front sight centered in the rear sight notch with the top edge of the front sight level **aligned** with the top edge of the rear sight. There should be equal space on either side of the front sight. See figure 3-1.

Figure 3-1. Sight Alignment.

Establishing Sight Alignment

The pistol is fired without benefit of bone support; therefore, the pistol is in constant motion. The Marine must understand this, yet continually strive to align the sights. To fire accurately, the sights must be aligned when the shot breaks.

Grip

The grip is key to acquiring sight alignment. If the grip is correct, the front and rear sights should align naturally. Dry fire during presentation of the M9 service pistol aids in obtaining a grip that allows sight alignment to be acquired consistently.

Controlled Muscular Tension

There must be enough controlled muscular tension in the grip, wrists, and forearms to hold the pistol steady and level the barrel to maintain sight alignment. Consistent tension stabilizes the sights and maintains sight alignment.

Sight Picture

Sight picture is the placement of the front sight in relation to the target while maintaining sight alignment. See figure 3-2 on page 3-2.

Because the pistol is constantly moving, sight picture is acquired within an aiming area that is located center mass on the target. The aiming area allows for movement of the sights on the target while maintaining sight alignment. Each Marine defines an acceptable aiming area within his own ability to stabilize the sights. Time, distance to the target, and personal ability affect dictate the aiming area. As the Marine becomes more proficient with the pistol, the aiming area becomes more precise.

Figure 3-2. Sight Picture.

The aiming area is determined by the Marine's stability of hold. The proper grip stabilizes the sights so sight alignment can be maintained, but the sights move continuously within the aiming area of the target. The Marine understands the pistol's movement and learns to apply trigger control as he is obtaining sight alignment/sight picture within the aiming area so the shot breaks the moment sight picture is established.

Relationship Between the Eye and the Sights

The human eye can focus clearly on only one object at a time. The Marine must focus on the top edge of the front sight and fire the shot while maintaining the relationship between the front and rear sights within the aiming area. Focusing on the top edge of the front sight rather than the target keeps the front sight clear and distinct, which allows the Marine to detect minor variations in sight alignment. Secondary vision allows the Marine to see the target (although slightly blurred) and maintain sight picture within his aiming area.

Trigger Control

Trigger control is the Marine's skillful manipulation of the trigger that causes the pistol to fire while maintaining sight alignment and sight picture. Proper trigger control aids in maintaining sight alignment while the shot is fired.

Sight Alignment and Trigger Control

Aiming and trigger control are mutually supportive—one cannot be performed without the other. Sight alignment and trigger control must be performed simultaneously to fire an accurate shot. As pressure is applied to the trigger, the sights may move, causing them to be misaligned. To fire accurate shots, the sights must be aligned when the shot breaks. Trigger control can actually assist in aligning the sights. With proper trigger finger placement and consistent muscular tension applied to the grip, the sights can be controlled as the trigger is moved to the rear. If the sights move extensively while pressing the trigger, this can indicate an improper grip or inconsistency in the muscular tension being applied to the grip.

Grip

A firm grip is essential for good trigger control. The grip is established before applying trigger control and is maintained throughout the firing process. To establish the grip, the hand is placed around the pistol grip in a location that allows the trigger finger to move the trigger straight to the rear while maintaining sight alignment. Once the grip is established, it should be firm enough to allow manipulation of the trigger while maintaining sight alignment. The pressure applied to the grip must be equal to or more than the pressure required to move the trigger to the rear. If the pressure is not applied correctly, the sights move as the trigger is pressed to the rear and sight alignment is disturbed.

Trigger Finger Placement

Once the grip is established, the finger is placed on the trigger. Placement of the finger should be natural and allow free movement of the trigger finger. A natural trigger finger placement allows the trigger to be moved straight to the rear while maintaining sight alignment. If the finger presses the trigger to the side, it can cause an error in sight alignment and shot placement.

Each Marine must experiment with finger placement in order to determine effective placement on the trigger. Once established, effective trigger finger placement allows the trigger to be consistently moved straight to the rear while maintaining sight alignment.

Types of Trigger Control

Uninterrupted Trigger Control

During uninterrupted trigger control, the Marine applies a steady, unchanging pressure to the trigger until the shot is fired. Uninterrupted trigger control is particularly effective at close range, when the target area is large, and when stability of hold is not critical for accuracy. To apply uninterrupted trigger control, apply pressure on the trigger while maintaining focus on the top edge of the front sight. Continue pressure on the trigger to begin moving the trigger straight to the rear while obtaining sight alignment and sight picture. Move the trigger straight to the rear in a single, smooth motion with no hesitation.

Interrupted Trigger Control

Interrupted trigger control is particularly effective at longer ranges, when the target is small, and when stability of hold is critical to maintaining sight picture in the aiming area. This method is also used if the pistol sights move outside the aiming area when applying trigger control. If the sight picture is outside the aiming area, the Marine stops and holds the rearward movement on the trigger until sight picture is re-established. When sight picture is re-established, the rearward movement of the trigger is continued until the shot is fired.

Breath Control

Breathing causes movement of the chest, abdomen, and shoulders, which causes the pistol sights to move vertically while attempting to aim and fire. Therefore, it is necessary to stop breathing for a period of time while firing a shot or a series of shots.

The object of breath control is to stop breathing just long enough to fire the shot while maintaining sight alignment, stabilizing the sights, and establishing the sight picture. To be consistent, the breath should be held at the same point in the breathing cycle; i.e., the natural respiratory pause.

Breathing should not be stopped for too long because it has adverse visual and physical effects. Holding the breath longer than is comfortable results in a lack of oxygen that causes vision to deteriorate and then affects the ability to focus on the sights.

Application of Marksmanship Fundamentals in Field Firing

Compression of the Fundamentals

Pistol engagements typically occur over close distances and are short in duration. Because an immediate response to the threat is required, the application of the fundamentals must be a conditioned response that is executable in a compressed time. The goal of successful, quick target engagement is the application of the fundamentals of marksmanship while firing the shot the moment weapon presentation is complete.

The time required to move the trigger to the rear while acquiring and maintaining sight alignment and sight picture is unique to each Marine and is based on his capabilities. Each Marine should

know his abilities and fire only as quickly as he is capable of firing accurately. The Marine must not exceed his shooting skills in an effort to get rounds off quickly.

Aiming

In field firing, the fundamentals are applied in a compressed time so sight alignment and sight picture are achieved as the shot is fired. Although the target must be quickly engaged in combat, sight alignment is still the first priority: strive for a clear front sight. Distance to the target and the size of the target affects sight alignment as follows:

- As the distance to the target increases and the size of the target decreases, sight alignment becomes more critical to target engagement. Accurate sight picture/sight alignment cannot be compromised for speed.
- Sight alignment is critical to the effective engagement of smaller targets such as partially exposed targets.
- As the distance to the target decreases, perfect sight alignment is not as critical, but there must be a relationship between the sights and their placement on the target within the aiming area to ensure accuracy.

Trigger Control

Proper trigger control aids in maintaining sight alignment while the shot is fired. As pressure is applied to the trigger, the sights may move, causing them to be misaligned. Therefore, the Marine is constantly re-aligning the sights as pressure is applied to the trigger. Sight alignment and trigger control must be performed simultaneously to fire an accurate shot.

Breath Control

During combat, the Marine's breathing and heart rate often increase due to physical exertion or the stress of battle. The key to breath control in field firing is to stop breathing just long enough to fire an accurate shot or a series of shots.

CHAPTER 4
PISTOL FIRING POSITIONS AND GRIP

The M9 service pistol is fired from the standing, kneeling, and prone positions. Each firing position may be adapted to either a Weaver or Isosceles variation, each possessing a distinct advantage in combat. The Weaver variation stabilizes the pistol sights. The Isosceles variation manages recoil. The advantages apply whether the Marine is firing in the standing, kneeling, or prone position. The Marine must select and assume a stable firing position that provides a solid foundation for accurate shooting while meeting the demands of the combat situation

Note: The procedures in this chapter are written for right-handed Marines; left-handed Marines should reverse directions as needed.

The Pistol Firing Position

During combat, the Marine selects a firing position based on mobility, observation of the enemy, and stability.

Mobility

A firing position must provide mobility should the Marine need to move. The standing position permits maximum mobility because it is quickly assumed and easily maneuvered from and it permits lateral mobility to engage widely dispersed targets. The prone position provides limited mobility because it is the most time-consuming position to get into and out of and it lacks the lateral mobility required to engage dispersed targets.

Observation of the Enemy

A firing position should allow observation of the enemy while minimizing the Marine's exposure. During combat there can be many obstructions to a clear field of view. Terrain features such as vegetation, earth contours, and manmade structures often dictate the firing position. The prone position normally allows the least exposure, but it usually provides a limited field of view. Kneeling may provide a wider field of view, but generally provides less concealment.

Stability

A solid firing position establishes a stable foundation for target engagement and provides accurate and consistent shooting. The definition of a stable position is one in which the body is positioned so as to resist forces that cause motion (i.e., recoil and movement of the pistol sights). The standing position is the least stable firing position, while the prone is the most stable firing position. A consistent, stable position is assumed for two distinct purposes:

- Minimize the pistol's movement in order to control the sights and to deliver accurate fire on a target.
- Minimize the affects of recoil in order to recover the sights to the same area on the target.

During combat, it may be necessary to engage the same target more than once to eliminate it. If the firing position is stable, the pistol's sights should recover to the same area on the target, allowing rapid re-enactment. Distributing the body's weight to balance the position also stabilizes the pistol and allows better management of recoil. A pistol firing position is stabilized through controlled muscular tension. Because the pistol is fired without benefit of bone support, muscular tension is needed in the body to stabilize the position and the pistol sights. Muscular tension must follow these guidelines—

- A consistent amount of muscular tension is needed to hold the pistol steady so the sights are aligned with the aiming eye and the target.

- Controlled and consistent tension in the body provides resistance that the Marine uses to manage recoil and bring the sights back on target quicker. However, too much tension can cause strain or trembling.
- Muscular tension is correct when the Marine can control the pistol before, during, and after firing the shot.

Pistol Firing Grip

A proper grip is one that provides maximum control of the pistol before, during, and after firing. It stabilizes the pistol sights before firing, allows trigger control to be applied during firing, and manages recoil after firing.

Before Firing: Stabilize the Sights

To fire an accurate shot, the sights must be stabilized prior to and as the bullet exits the muzzle of the pistol. A proper grip controls the alignment of the pistol's sights and stabilizes the sights so an accurate shot may be fired. The following guidelines apply to the establishment of a proper grip—

- There must be muscular tension in the wrist and forearms. Consistent muscular tension in the wrist, forearms, and grip helps maintain sight alignment by reducing the movement in the grip that can cause movement in the sights. The grip is correct when it allows the sights to be naturally aligned to the aiming eye.
- When establishing a two-handed grip, equal pressure must be applied with both hands. Consistent, equal pressure from both hands stabilizes the sights and allows them to be aligned and level with respect to the aiming eye.
- The hand grips as high on the back strap as possible, bringing the centerline of the bore as close as possible to a parallel line with the bones in the forearm.

During Firing: Allow Trigger Control

The Marine's grip provides a foundation for the movement of the trigger finger. The trigger finger applies positive pressure on the trigger as an independent action, completely free of the other muscles of the gripping hand. The Marine should not apply excessive pressure to the web of the hand touching the pistol's back strap because excessive pressure interferes with the manipulation of the trigger by the trigger finger.

After Firing: Manage Recoil

Once a shot is fired, the pistol recoils, disturbing alignment of the sights. A proper grip facilitates a quick recovery from recoil so the sights quickly return to the same area on the target. The Marine's grip determines the following during recoil:

- The amount the muzzle climbs during recoil depends on the amount of controlled muscular tension in the grip and wrists applied to stabilize the pistol and create consistency in resistance to recoil. Controlled muscular tension allows the sights to recover consistently back on target within a minimum amount of time.
- Firm, equal pressure must be applied to the grip with both hands to ensure that the pistol does not slip during recoil. An improper grip or lack of controlled muscular tension causes the pistol to move after the shot is fired, disrupting sight alignment and requiring the Marine to re-establish his grip.
- Locking out the wrist of the firing hand, similar to executing a punch, helps provide resistance to recoil and speed recovery. The elbows should be at a position slightly less than locked out to help absorb the recoil and aid in recoil management.

Withdrawing the Pistol From the Holster

The firing grip is not established in the holster, however, a proper firing grip can be assumed quickly if the pistol is withdrawn from the holster correctly. The pistol should be withdrawn from the holster in one continuous, fluid motion:

- Place the heel of the left hand at the center of the torso with the fingers extended toward the target. At the same time, unfasten and release the D-ring with the right hand. See figure 4-1.

Figure 4-1. Withdrawing the Pistol From the Holster—Step 1.

Note: The left hand is placed on the torso in a position that allows a two-handed firing grip to be established in a minimum amount of movement.

- Place the right thumb on the forward edge of the lower portion of the holster and the fingers around the back edge of the holster, keeping the trigger finger straight. See figure 4-2.

Note: The left hand may assist in holding the holster flap up.

Figure 4-2. Withdrawing the Pistol From the Holster—Step 2.

- Slide the hand up the holster until the fingers come in contact with the pistol grip. At the same time, keep the thumb above the pistol to guide the holster flap up. See figure 4-3 on page 4-4.
- Grasp the pistol grip with the fingers and draw the pistol straight up. Continue withdrawing the pistol while moving the thumb to a position on the safety. See figure 4-4 on page 4-4.

Note: This hand placement allows a firing grip to be established once the thumb disengages the safety. Any adjustments made to the firing grip after the safety is disengaged should be minor.

Figure 4-3. Withdrawing the Pistol From the Holster—Step 3.

Figure 4-4. Withdrawing the Pistol From the Holster—Step 4.

- Once the muzzle clears the holster, rotate the muzzle forward to clear the body. Ensure the muzzle is pointed in a safe direction.
- Establish a two-handed grip on the pistol by joining the left hand with the right hand in the front of the torso. See figure 4-5.

Caution

Ensure the muzzle does not cover the left hand when establishing the two-handed grip.

Figure 4-5. Withdrawing the Pistol From the Holster—Step 5.

Weaver and Isosceles Variations

The size of the target, distance to the target, time, and type of engagement needed (i.e., two shots, single precision shot) determine whether to fire in the Weaver or Isosceles variation. The Weaver and Isosceles variations each consist of three firing positions: standing, kneeling, and prone. The firing position chosen is based on the combat situation and the Marine's body configuration, and

it must permit balance, control, and stability during firing. In addition, there is a specific firing grip that supports each position and the combination of the grip and the body configuration is key to establishing the variation. See table 4-1 for a list of advantages and disadvantages of both the Weaver and the Isosceles variations.

At longer ranges, the target is smaller, a more precise shot is required to eliminate the target, and any small movement moves the sights off the target; therefore, the pistol must be steadied. Although the Weaver variation is effective at any distance, some aspects of the position make it more effective for long range or precision shots on small or partially exposed targets; i.e., sight alignment and sight picture are easier for stability of hold.

The Isosceles variation is effective at any distance, however, some aspects of the position make it more effective for close range engagements. When confronted with a target, the natural physical reaction is to face the target and push out with the arms. This makes the Isosceles variation advantageous for quick engagements at close range. When a target is at close range, it must be engaged quickly before it engages the Marine. The management of recoil is a bigger factor in close-range engagements because it is more likely that multiple shots will be fired to eliminate the target and the sights have to recover quickly back on target. However, at close ranges, the target is larger so stability of hold is not as important because it is easier to hold the sights on target and sight picture is not as critical.

Standing Position

The standing position is the most often employed position during a pistol engagement due to the short distance of the engagement and the nature of combat. When properly assumed, the standing position provides a stable base for firing, a clear field of view, and excellent mobility. The standing position can be adapted to either the Weaver variation or the Isosceles variation.

Weaver Standing Position

The key to successful employment of the Weaver variation is the body's angle to the target and the push-pull pressure applied to the grip. See figure 4-6.

Table 4-1. Advantages and Disadvantages.

Variation	Advantages	Disadvantages
Weaver	Additional balance, control, and stability of hold during firing due to placement of the arms (left arm bent, pistol is in close to the body). Easier to maintain sight picture because the pistol's foundation is steady.	Recoil has a greater impact due to the hand placement on the pistol (some of the pistol grip is exposed and pressure is applied in two different directions around the pistol). Recovery of the sights back on target may take longer since recoil is affected.
Isosceles	Recoil has a lesser impact because muscular tension and grip pressure are evenly distributed around the pistol. Allows quicker recovery of the sights on target.	Stability of hold is degraded due to the pistol being further from the body without support. Since it is harder to steady the pistol, acquiring sight picture becomes more difficult.

To assume the Weaver standing position—

- Face the target and make a half turn to the right, keeping the pistol oriented toward the target. This orients the body at approximately a 40 to 60 degree angle oblique to the target. The shoulders are angled to the target, the left shoulder forward of the right. The feet are about shoulder-width apart, the left foot forward of the right.
- Grip the pistol grip firmly with the right hand. Place the right thumb on the safety.
- Keep the shoulders at a 40 to 60 degree angle oblique to the target and raise the right arm and extend it across the body toward the target. Ensure that the right shoulder does not roll forward or turn toward the target.
- Extend the left arm to the target, bending the left elbow to join the left and right hands. The left elbow is inverted and tucked in toward the body so the left arm supports the pistol.

  Note: The angle of the body determines how much the elbow bends.

Figure 4-6. Weaver Standing Position.

- Establish a two-handed firing grip in the Weaver variation. See figure 4-7.
- Place the palm of the left hand over the front of the right hand so the palm covers the curled fingers of the right hand. The trigger guard should rest in the "V" formed by the left thumb and forefinger. The knuckles of the left hand are just outboard of the trigger guard. A portion of the pistol grip is exposed.
- Rest the trigger finger naturally, straight and outside of the trigger guard, so the finger can be moved quickly and easily to the trigger.
- Rest the left thumb against the receiver so that both thumbs are on the left side of the pistol. Once the safety is disengaged with the right thumb, the left thumb is placed over the right thumb and positive pressure is applied to hold the right thumb in place.
- Apply rearward pressure with the left hand and forward pressure with the right hand to achieve a "push-pull" grip. Isometric tension (push-pull) stabilizes the pistol during firing.

Weapon on Safe

Weapon on Fire

Figure 4-7. Weaver Grip.

- Lean forward slightly and apply muscular tension throughout the body to stabilize the position and manage recoil. The muscular tension in the upper body is not symmetrical due to the "push-pull" tension applied on the grip.
- Keep the head erect so the aiming eye can look through the sights.

Isosceles Standing Position

The key to the Isosceles variation is that the body is squared to the target and equal pressure is applied on the pistol from the grip. To assume the Isosceles standing position—

- Face the target with feet approximately shoulder width apart. The shoulders are squared to the target.
- Establish a two-handed firing grip in the Isosceles variation. See figure 4-8.

Figure 4-8. Isosceles Grip.

- Grip the pistol grip firmly with the right hand. Place the right thumb on the safety.
- Place the heel of the left hand on the exposed portion of the pistol grip in the pocket formed by the fingertips and heel of the right hand. There should be maximum contact between the pistol grip and the hands. Wrap the fingers of the left hand over the fingers of the right hand. Ensure both thumbs rest on the left side of the pistol and point toward the target.
- Apply equal pressure on both sides of the pistol to allow for the best management of recoil.

  Note: Ensure the left thumb does not apply excessive pressure to the slide stop or slide.

- Rest the trigger finger naturally, straight and outside of the trigger guard, so the finger can be moved quickly and easily to the trigger.

  Notes: Index finger of the left hand may or may not rest on the front of the trigger guard.

  Marines with large hands must ensure that their right thumb does not rest on the slide stop, preventing reliable pistol operation.

- Elevate and extend the arms toward the target.
- Roll the shoulders forward and shift the body weight slightly forward to stabilize the position and better manage recoil. The left foot may be slightly forward of the right foot to balance the position. There should be an equal amount of muscular tension on both sides of the body to best manage recoil.
- Tuck the head between the shoulders; the head is extended forward but kept erect so the aiming eye can see through the sights. See figure 4-9.

Figure 4-9. Isosceles Standing Position.

Kneeling Position

The kneeling position offers a smaller exposure than the standing position and greater stability. Increased stability makes the kneeling position effective for longer range shooting. It does not,

however, offer as much mobility for quick reaction as the standing position. The kneeling position can be quickly assumed and allows firing from various types of cover. Depending on the cover and the need for observation, the kneeling position may be adapted to a high kneeling, a medium kneeling, a low kneeling, or a two-knee kneeling position. The kneeling positions can be adapted to either the Weaver variation or the Isosceles variation.

Weaver Kneeling Position

The advantage of the Weaver variation of the kneeling position is that it provides bone support due to the left elbow's placement on the knee. The Weaver variation further enables firing from the side of cover while exposing less of the body to a threat. To assume the Weaver kneeling position, the following steps are basic to all adaptations:

- Make a half turn to the right, drop the right foot back or step forward with the left foot, and place the right knee on the deck. The body is positioned at a 40 to 60 degree angle oblique to the target.
- Blade the shoulders at a 40 to 60 degree oblique angle to the target, the left shoulder forward of the right.
- Extend the arms toward the target.
- Bend forward at the waist to better manage recoil.
- Place the flat part of the upper left arm, just above the elbow, in firm contact with the flat surface formed on top of the bent knee. The point of the left elbow extends just slightly past the left knee. However, depending on the need for stability or observation of the enemy, the elbow does not have to rest on the knee.

The following steps provide specifics for each adaptation:

- High kneeling: the toes of the right foot are curled and in contact with the deck or the inside of the foot may be in contact with the deck. Depending on the need for observation, the buttocks may or may not rest on the right heel. The left leg is bent at the knee; the shin straight up and down. The left foot is flat on the deck. See figure 4-10.

Figure 4-10. Weaver High Kneeling.

- Medium kneeling: the right ankle is straight with the foot stretched out and the bootlaces in contact with the deck. The left leg is bent at the knee, the left foot flat on the deck. The right shin may be angled to the body to create a tripod of support for the position. See figure 4-11.

Figure 4-11. Weaver Medium Kneeling.

- Low kneeling: the right ankle is turned so the outside of the foot is in contact with the deck and the buttocks are in contact with the inside of the foot. The right shin may be angled to the body to create a tripod of support for the position. See figure 4-12.

Figure 4-12. Weaver Low Kneeling.

- Two-knee: drop both knees onto the deck. The toes may be curled to get into and out of the position quickly. Depending on the need for observation of the enemy, the buttocks may or may not rest on the heels. See figure 4-13.

Isosceles Kneeling Position

The advantage of the Isosceles variation is that it enables the Marine to fire over the top of cover while exposing less of the body to a threat. To assume the Isosceles kneeling position, the following steps are basic to all adaptations:

- Drop the right foot back or step forward with the left foot and place the right knee on the deck.
- Square the shoulders to the target.
- Extend the arms toward the target.
- Lean forward with the shoulders rolled forward and the head tucked between the shoulders to better manage recoil.

Figure 4-13. Weaver Two-Knee Kneeling.

The following steps provide specifics for each adaptation:

- High kneeling: the toes of the right foot are curled and in contact with the deck or the inside of the foot may be in contact with the deck. Depending on the need for observation, the buttocks may or may not rest on the right heel. The left leg is bent at the knee, the shin is straight up and down. The left foot is flat on the deck. See figure 4-14.

Figure 4-14. Isosceles High Kneeling.

- Medium kneeling: the right ankle is straight with the foot stretched out and the bootlaces in contact with the deck. The left leg is bent at the knee, the left foot is flat on the deck. The right shin may be angled to the body to create a tripod of support for the position. See figure 4-15.

Figure 4-15. Isosceles Medium Kneeling.

- Low kneeling: the right ankle is turned so the outside of the foot is in contact with the deck and the buttocks are in contact with the inside of the foot. The right shin may be angled to the body to create a tripod of support for the position. See figure 4-16.

Figure 4-16. Isosceles Low Kneeling.

- Two-knee: drop both knees onto the deck. The toes may be curled to get into and out of the position quickly. Depending on the need for observation of the enemy, the buttocks may or may not rest on the heels. See figure 4-17.

Figure 4-17. Isosceles Two-Knee.

Prone Position

The prone position is easily assumed, stable, and presents a small target to the enemy. Since the prone position places most of the body on the deck, it offers great stability for long range shooting. However, it is the least mobile of the firing positions and may restrict the field of view. The prone position can be adapted to either the Weaver variation or the Isosceles variation.

Weaver Prone Position

The Weaver variation of the prone position produces a cocked leg position by angling the body to the target and cocking the leg to support the position. The Weaver prone position is ideal for firing from behind cover. See figure 4-18.

Figure 4-18. Weaver Prone Position.

To assume the Weaver prone position, perform the following steps:

- Face the target and make a half turn to the right (this places the body at a 40 to 60 degree oblique to the target). Grip the pistol in the right hand, placing the pistol in a position that facilitates control of the weapon. Ensure the pistol is pointed in a safe direction and does not cover any portion of the body.
- Move the body to the deck by using either the squat or drop method, keeping the body at a 40 to 60 degree oblique to the target.

  Squat Method
  - Squat down and place the left hand on the deck.
  - Kick both feet backward and come down on the right side of the body with the right arm extended toward the target.
  - Ensure the pistol does not cover the body or the left hand. See figure 4-19.

  Drop Method
  - Drop to a kneeling position.
  - Place the left hand on the deck in front of the body, push the pistol out toward the target.
  - Roll the right side of the body onto the deck.
  - Ensure the pistol does not cover the body or the left hand. See figure 4-20 on page 4-12.
- Bring the left knee up to support the firing position and to raise the diaphragm off the deck so as not to interfere with breathing. The inside of the knee rests on the deck. The knee is drawn up to provide maximum stability for the position.
- Establish a two handed-firing grip on the pistol.

Figure 4-19. Squat Method.

- Place the left elbow on the ground for stability. For maximum stability, strive to keep the grip firmly placed on the deck.
- The head may rest against the right arm so the pistol sights can be aligned. The head may be canted as long as the aiming eye can look directly through the sights. Strive to keep the pistol sights as level as possible while acquiring sight alignment.

To make minor increases in elevation, keep the left hand in place and firmly on the deck and raise the right hand to achieve the desired elevation. However, contact between the right and left hands must be maintained to stabilize the pistol. See figure 4-21 on page 4-12. (There is a tradeoff between obtaining the needed elevation and losing stability, so the Marine must strike a balance between the two.)

Figure 4-20. Drop Method.

Figure 4-21. Increasing Elevation (Minor Adjustments).

Isosceles Prone Position

The Isosceles variation of the prone position produces a straight leg position. See figure 4-22.

To assume the Isosceles prone position:

- Stand facing the target. Grip the pistol in the right hand, placing the pistol in a position that facilitates control of the weapon. Ensure the pistol is pointed in a safe direction and does not cover any portion of the body.
- Move the body to the deck by using either the squat or drop method.

  Squat Method
  - Squat down and place the left hand on the deck.
  - Kick both feet backward and come down on the right side of the body with the right arm extended toward the target.
  - Ensure the pistol does not cover the body or the left hand. See figure 4-23.

  Drop Method
  - Drop to a kneeling position.
  - Place the left hand on the deck in front of the body.

Figure 4-22. Isosceles Prone Position.

Figure 4-23. Squat Method.

- Push the pistol out toward the target, and roll the right side of the body onto the deck.
- Ensure the pistol does not cover the body or the left hand. See figures 4-24.

- Establish a two-handed firing grip on the pistol.
- Spread the legs to a position that provides maximum stability. The insteps of both feet may be flat on the deck or the toes may be curled and dug into the deck.
- Keep the pistol sights as level as possible while acquiring sight alignment. Keep the head in a position to allow the aiming eye to look directly through the sights.
- When wearing a helmet, the head may be canted slightly and rest against the right arm to push the helmet from the eyes so the sights can be aligned. Likewise, the pistol may be canted outboard to allow the aiming eye to look directly through the sights.

To make minor increases in elevation, keep the left hand in place and firmly on the deck and raise the right hand to achieve the desired elevation. However, contact between the right and left hands must be maintained to stabilize the pistol. See figure 4-25 on page 4-14. (There is a tradeoff between obtaining the needed elevation and losing stability, so the Marine must strike a balance between the two.)

Natural Body Alignment

The body must be properly aligned to the target so the sights fall naturally on the target when the pistol is presented. It takes a combination of body alignment and consistent muscular tension to

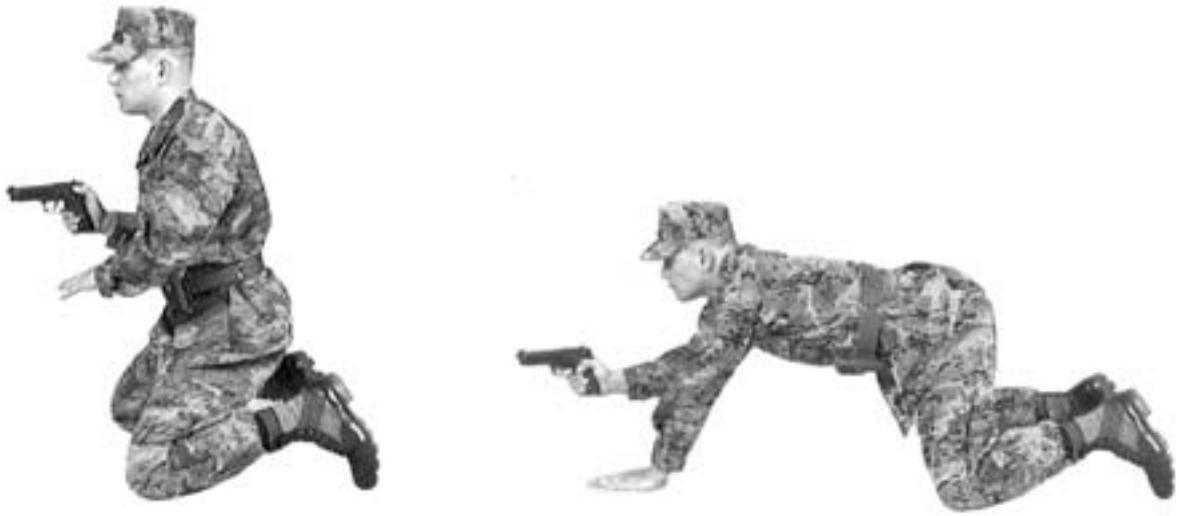


Figure 4-24. Drop Method.

Figure 4-25. Increasing Elevation (Minor Adjustments).

ensure the sights fall naturally to the same area of the target every time the pistol is presented. The Marine can execute the following to check natural body alignment and to ensure the sights center on the aiming area:

- Orient the body to a target and establish a variation of the standing position and a two-handed firing grip on the pistol. Aim in on the target.
- Close the eyes and take a deep breath.
- Open the eyes and see where the pistol sights are in relation to the target. If the pistol sights are right or left of the target, move the feet to adjust the position right or left.

  Note: Do not force the sights onto the target area by moving the arms; this increases the muscular tension on one side of the body, disturbs balance, and makes recoil harder to manage.

If the sights are significantly out of alignment when the pistol is at eye level, it may be an indication of a poor grip. When the grip is correct (to include the muscular tension in the grip, wrist, and forearms), the sights should align to the point that only minor adjustments are needed to align the sights to the aiming eye.

Repeat the preceding steps as necessary. Body alignment and muscular tension are correct when the sights are naturally placed in the same area on the target every time the Marine aims on the target.

CHAPTER 5
USE OF COVER AND CONCEALMENT

On the battlefield, a firing position that allows maximum observation of the enemy as well as cover and concealment is a necessity. A good position provides a solid foundation for the pistol, maximizes the use of cover to provide protection from enemy fire, allows mobility, and provides observation of the enemy. Where possible, the cover should be used to provide additional support for the position.

When contact with the enemy is made, it is important to seek cover as quickly as possible. Cover is anything that provides protection from enemy fire. Cover should be, at a minimum, thick enough to stop small arms fire and high enough to protect the Marine when firing from behind it. The effective use of cover enables engagement of enemy targets while affording protection from enemy fire. Cover can also be effectively used to conceal the Marine from enemy view while searching for targets.

Concealment is anything that hides a Marine from enemy view; however, it might not afford protection. Concealment can be provided by brush, trees, etc.

> *Note:* The procedures in this chapter are written for right-handed Marines; left-handed Marines must reverse directions as needed.

Cover Materials

Natural cover (rocks, logs, rubble, etc.) is best because it is hard to detect. But any material (including buildings, structures, etc.) that may protect an individual from small arms fire can be used for cover. Some common types of cover material are as follows.

Dirt

The best type of cover is dirt packed to a minimum thickness of 18 inches.

Cinder Blocks

Cinder blocks used as foundations for houses or walls can be used for cover, but they can be penetrated. They are also brittle and can shatter upon impact from small arms fire, which can cause injury by secondary fragmentation.

Trees, Logs, and Telephone Poles

Wood is a relatively dense material; therefore, it offers good covering protection since bullets have a tendency to fragment as they penetrate. Live trees have a greater resistance to bullet penetration than dead wood. Wood that has been treated with creosote, such as telephone poles and railroad ties, offers better protection from projectiles than untreated wood, but it still does not ensure protection from small arms fire.

Sandbags

Sandbags can be used for cover. However, they should always be packed tightly and tamped down to increase their density. If loosely filled or moist, a bullet can more easily penetrate the sandbag. Doubling or overlapping sandbags also increases their protective qualities.

Considerations for Firing From Cover

Adjusting the Firing Position

Cover can provide additional support for the firing position. The firing position is adjusted to ensure stability, mobility, and observation of the enemy.

The Marine chooses a firing position based on his height in relation to the height of the cover. The firing position must minimize exposure to the enemy but allow observation of the area.

Although the cover provides additional support, the Marine continues to apply the same amount of muscular tension in the grip, wrist, and forearms. Muscular tension is still necessary to stabilize the pistol sights and manage recovery.

Because the sights are higher than the muzzle of the pistol, the Marine must ensure that the muzzle of the pistol clears the cover as he obtains sight alignment/sight picture on the target. The closer the Marine is to the cover, the easier it is to ensure the muzzle clears the cover.

Applying the Weaver and Isosceles Variations

The type of cover may dictate which variation of a firing position will be the most effective. The position should provide the Marine with the maximum amount of stability and control and allow the Marine to manage recoil effectively in order to recover on target.

Weaver Variation

The Weaver variation exposes less of the body from behind cover due to the angle of the body. The Weaver variation may be better suited for firing from behind the right or left side of cover. For example, the Weaver prone is ideal for firing from behind a log.

Isosceles Variation

The Isosceles variation is good for firing over the top of cover (e.g., a window). The Isosceles prone is ideal for firing from behind narrow cover (e.g., a telephone pole).

Keeping the Body Behind Cover

Avoid inadvertent exposure of any part of the body. Be especially aware of the top of the head, elbows, knees, or any other body part that may extend beyond the cover.

Log or Curb

When firing from behind a log or curb, the Marine must present the lowest possible silhouette and may use the log or curb for maximum support of the position. For maximum protection, muzzle clearance is kept as close as possible to the top of the log or curb. The Marine may fire from either the side or the top of the log, depending on cover and concealment (see fig. 5-1). The Marine fires over the top of a curb when it is used for cover.

Figure 5-1. Firing Around a Log.

Wall or Barricade

Firing is done from either the side or over the top of a wall or barricade. See figure 5-2.

Figure 5-2. Firing From a Barricade.

Window

If the Marine has not been detected by the enemy, he should use the side of the window or the window sill for support. Ideally, it is best to fire from the corner of the window sill when using the window for support. If there is little chance for detection or the shot can be made without support, the Marine should remain back and to the side of the window opening so the pistol does not protrude and his body is concealed by the shadows/darkness of the room. If the Marine is positioned too close to the window, his body provides a silhouette to the enemy.

Vehicle

In many combat situations, particularly in urban environments, a vehicle may be the best form of cover. When using a vehicle for cover, the engine block provides the most protection from small arms fire. The Marine establishes a position behind the front wheel or front door jamb so the engine block is between him and the target. See figure 5-3.

From this position, the Marine fires over the hood of the car or underneath the car from behind the wheel. At the back of the car the axle and the wheel provide the only cover. If the Marine must shoot from the back of the car, he must position himself directly behind the wheel as much as possible. See figure 5-4.

Figure 5-3. Firing Over the Hood of a Vehicle.

Figure 5-4. Firing From the Back of a Vehicle.

Providing Support for the Position and the Pistol

Support helps stabilize both the firing position and the pistol and enable the Marine to maintain sight alignment and sight picture.

The forearms or hands can contact the support to stabilize the pistol. The Marine may rest the pistol on or against the support as long as the support does not interfere or affect the pistol's cycle of operation. See figure 5-5.

Figure 5-5. Hand Resting on Support.

When firing over the top of cover, the Marine can establish a supported position and stabilize the position by resting the trigger guard or the magazine on the cover. The pistol may be pushed up against the support so the "V" formed by the receiver and the front of the trigger guard rests firmly against the support. See figure 5-6.

Figure 5-6. Trigger Guard Resting Against Support.

When firing around the sides of cover, the Marine can establish support and stabilize the position by placing the back of the hand or arm against the cover. Avoid placing the slide of the pistol against the cover because it can interfere with the pistol's cycle of operation. However, the pistol can be canted and placed against the cover so the trigger guard or the "V" formed between the receiver and trigger guard rests against the support. This position enables the Marine to expose less of himself to the enemy. See figure 5-7.

Figure 5-7. Hand Resting Against Side of Support.

When using a vehicle for cover, the Marine can establish additional support for the pistol by positioning himself in the car behind the door jamb (frame of door) and placing his hands or pistol against the "V" formed by the open door and door frame. See figure 5-8.

When shooting from the left side of cover, the Marine still uses his right hand and eye. See figure 5-9. He may have to cant his head and the pistol to the left to establish sight alignment. For right-handed Marines, shooting from the left side of cover may expose more of the Marine to the enemy than shooting from the right side.

Figure 5-8. Firing From Behind the Door Jamb of a Vehicle.

Figure 5-9. Firing From the Left Side of Cover.

Changing Positions

If the Marine has been firing from cover and has to reload or clear a stoppage behind cover he should attempt to resume firing from a different position. The enemy is aware of the Marine's current position and will be ready to engage him once he re-appears.

Moving

In combat, the Marine must be constantly aware of his surroundings and the available cover should enemy contact occur during movement from one position to another.

When moving from cover to cover, the Marine selects the next cover location and plans the route of movement before leaving his present position. This is done by quickly looking from behind cover to ensure the area is clear, ensuring the head and eyes are exposed for as short a time as possible. If necessary, the Marine should conduct a Condition 1 reload before moving from cover. Once the Marine is committed to moving, he must focus on the move until cover is reassumed.

Supported Firing Positions

During combat, the Marine may not have the time to assume a perfect firing position. He must know instinctively that his position is correct rather than follow a regimented sequence of movements to ensure its correctness. With training, the Marine can assume stable firing positions quickly and instinctively by incorporating the use of cover for support. Support provides foundations for the firing position; which, in turn, provides support for the pistol. To maximize the support provided by the position, the firing position should be adjusted to fit or conform to the shape of the cover.

A supported firing position minimizes exposure to the enemy, maximizes the stability of the pistol and protection from fire, and provides observation of the enemy. Any stable support may be used (e.g., logs, sandbags, walls). The surrounding environment dictates the support and position.

The size, distance to the target, and time affect the need for stability and recovery in the selection of a supported firing position. For example, if the target is a great distance from the Marine, he may sacrifice some of his ability to manage recoil in order to assume a supported firing position that provides him the additional stability needed to fire accurately at long range. But, recovery may be more important for the Marine if he must fire multiple shots on target quickly; therefore, he may sacrifice some stability in his supported firing position in order to engage a target with multiple shots.

Supported Prone

The supported prone position presents the lowest silhouette and provides maximum protection from enemy fire. The supported prone position can be assumed behind a tree, a wall, or almost any type and size of cover. It is flexible and allows firing of the pistol from all sides. To assume the supported prone position and maximize the use of cover, the position is kept as low as possible to ensure no part of the body is exposed to the enemy. If the cover is narrow, the Marine positions his body directly behind cover and keeps his legs together. The Marine's body is in line with the pistol and directly behind the pistol. The Isosceles prone position presents a smaller target to the enemy and more body mass to absorb recoil. The Weaver prone position is ideally suited to fire from around cover (e.g., log) because of the angle of the body, but this position presents a larger target to the enemy. See figure 5-10.

Figure 5-10. Weaver Prone.

Supported Kneeling

If the prone position cannot be used because of the height of the support, the Marine may use the supported kneeling position. The kneeling position allows firing of the pistol from all sides. This position may be altered to maximize the use of cover or support by assuming a variation of the kneeling position (high, medium, low, or two-knee). The kneeling position provides more mobility than the prone position. See figure 5-11.

Caution

The Marine must not indicate to the enemy his position with his exposed knee. If the Marine changes knees while exposed to the enemy, he has indicated the direction of his next shot to the enemy.

Figure 5-11. Supported Kneeling.

Supported Standing

When use of the support is maximized, the supported standing position can be as stable as the supported kneeling or prone position. The supported standing position provides greater mobility than the other positions and usually provides greater observation of the enemy. In the standing position, the Marine must not allow the placement of his foot to indicate to the enemy his position behind cover. See figure 5-12.

Figure 5-12. Supported Standing.

Locate and Engage Targets From Behind Cover

To locate targets when behind cover or to ensure the area is clear before moving, the Marine must expose himself to the enemy. There are two techniques used to locate and engage targets from behind cover: the pie and the rollout. These techniques minimize the Marine's exposure to enemy fire while placing him in a position to engage targets or to move to another location if necessary. Both techniques are used in the kneeling and standing positions.

Pie Technique

The Weaver position is the most effective position when executing the pie technique because the position of the Marine's body minimizes exposure to the enemy. See figure 5-13.

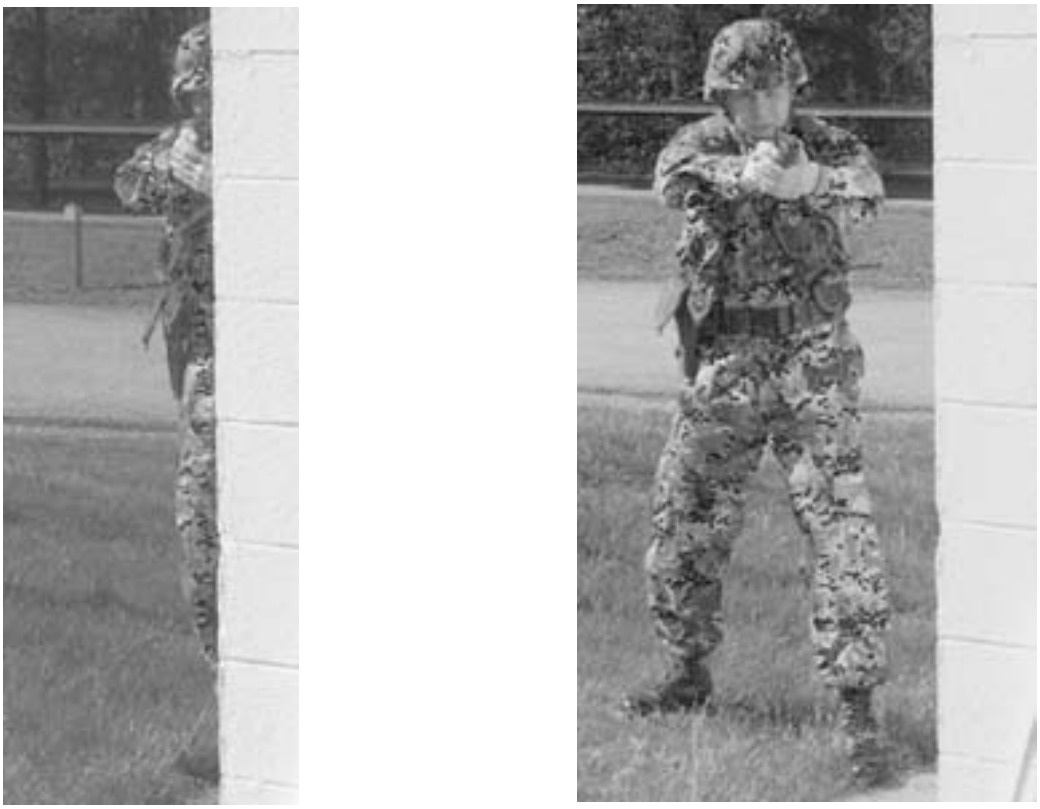


Figure 5-13. Pie Technique.

To perform the pie technique—

- Stay behind cover while moving back and away from the leading edge of the cover. The surroundings and situation dictate the distance the Marine moves back and away from the cover. Generally, the further back the Marine is from cover, the greater his area of observation; staying too close to cover decreases the area of observation.
- Assume a firing position and lower the pistol sights enough to have a clear field of view, aiming in on the leading edge of the cover.
- Take small side steps and slowly move out from behind cover, covering the field of view with the aiming eye and muzzle of the pistol. Wherever the eyes move, the muzzle should move (eyes, muzzle, target).
- Continue moving out from cover until a target is identified or the area is found to be clear. If a target is identified, sweep the safety off, place the finger on the trigger, and engage the target.

Note: If a target is identified before moving out from cover, the pistol should be thumb-cocked and off safe before moving out.

Rollout Technique

In this technique, the Isosceles position is the most effective position when executing the rollout technique because the position of the body allows the Marine to better maintain his balance. See figure 5-14. To perform the rollout technique—

- Stay behind cover, move back, and position the body so it is in line with the leading edge of the cover, ensuring that no part of the body extends beyond cover.
- Assume firing position and come to the Ready, ensuring the muzzle is just behind cover.
- Cant the head and pistol slightly and roll the upper body out to the side enough to obtain a clear field of view. Keep the feet in place and push up on the ball of one foot to facilitate rolling out.
- Continue to roll out from cover until a target is identified or the area is found to be clear. If a target is identified, sweep the safety off, place the finger on the trigger, and engage the target.

Figure 5-14. Roll-out Technique.

Note: If a target is identified before moving out from cover, the pistol should be thumb-cocked and off safe before moving out.

Combining the Pie and Rollout Techniques

In some situations, it may be necessary to utilize both the pie and rollout technique in order to search an entire area for targets (i.e., corner of a building, doorway). Changing from one technique to another may allow the Marine to minimize his exposure to the enemy and reduce the time he is exposed to enemy fire.

CHAPTER 6
PRESENTATION OF THE M9 SERVICE PISTOL

In combat, targets present themselves with little or no warning. The Marine must have the ability to react quickly and to effectively and efficiently present the pistol**,** whether the pistol is in the holster or at a carry. To successfully engage a combat target with the M9 service pistol, the Marine must master pistol presentation from the carries and transport, pistol presentation while assuming a firing position, and search and assess techniques.

Note: The procedures in this chapter are written for right-handed Marines; left-handed Marines should reverse directions as needed.

Sight Alignment/Sight Picture

Pistol presentation drills and dry fire help the Marine achieve a consistent grip and rapid presentation and aid in quickly acquiring sight alignment and sight picture. The Marine always executes the following steps:

- Identify the target and quickly present the pistol to the target while simultaneously sweeping the safety with the thumb of the right hand. (Disengaging the safety with the right thumb ensures the trigger is not pulled before taking the pistol off safe.)
- Shift the focus from the target to the front sight to obtain sight alignment while presenting the pistol. As the front sight breaks the plane of vision, acquire the front sight and begin to apply trigger control as sight picture is acquired.
- Apply trigger pressure until the shot is fired.

Presentation From the Carries and Holsters

Presentation From the Ready

To present the pistol from the Ready, the Marine performs the following steps in sequence. When a target appears—

- Sweep the safety with the thumb of the right hand, place the trigger finger on the trigger, and raise the arms to bring the pistol to the target.

  Note: If the Marine wishes to thumbcock the pistol for a single action shot, the pistol is thumbcocked with the left thumb after the safety is swept with the right thumb. The grip of the left hand may have to be broken to thumbcock the pistol; re-establish the grip after thumbcocking.

- Acquire sight alignment and sight picture within the aiming area and apply trigger pressure until the shot is fired.

Presentation From the Alert

To present the pistol from the Alert, the Marine performs the following steps in sequence. When a target appears—

- Sweep the safety with the thumb of the right hand, place the trigger finger on the trigger, and bring the pistol to the target:
  - If the arms are straight, raise the arms to a 45-degree angle with the deck.
  - If the arms are bent, straighten the arms out toward the target.

Note: If the Marine wishes to thumbcock the pistol for a single action shot, the pistol is thumbcocked with the left thumb after the safety is swept with the right thumb. The grip of the left hand may have to be broken to thumbcock the pistol; re-establish the grip after thumbcocking.

- Acquire sight alignment and sight picture within the aiming area and apply trigger pressure until the shot is fired.

Presentation From a Holster Transport

The pistol is presented from the holster in one continuous, fluid motion.

M12 Holster

To present the pistol from the M12 holster transport, perform the following steps in sequence once the target appears:

- Place the heel of the left hand at the center of the torso with the fingers extended toward the target. (The placement of the left hand allows a two-handed grip to be established in a minimum amount of movement.) At the same time, unfasten and release the D-ring with the right hand.
- Use the right hand to place the thumb on the forward edge of the holster and the fingers around the back edge of the holster, keeping the trigger finger straight.
- Slide the hand up the holster until the fingers come in contact with the pistol grip. At the same time, keep the thumb above the pistol to guide the holster flap up.
- Grasp the pistol grip with the fingers and draw the pistol straight up. Continue withdrawing the pistol while moving the thumb to a position on the safety.

  Note: Hand placement should allow the firing grip to be established once the thumb disengages the safety. Any adjustments made to the firing grip after the safety has been disengaged should be minor.

- Once the muzzle clears the holster, rotate the muzzle forward while sweeping the safety.
- Establish a two-handed grip on the pistol by joining the left hand with the right hand in front of the torso. At the same time, start to straighten the pistol out toward the target. See figure 6-1.

Figure 6-1. Presentation From the M12 Holster—Step 1.

- Continue moving the pistol toward the target and, at the same time, place the trigger finger on the trigger, acquire sight alignment and sight picture within the aiming area, and apply trigger pressure until the shot is fired. See figure 6-2.

Figure 6-2. Presentation From the M12 Holster—Step 2.

When time permits to thumbcock the pistol for a single action shot (e.g., a long-range engagement), the Marine presents the pistol from the holster by performing the following steps once the target appears:

- Withdraw the pistol from the holster.
- Sweep the safety with the thumb of the right hand.
- Join the left and right hands and thumbcock the pistol with the left thumb.
- Establish a two-handed grip on the pistol.
- Straighten the pistol out toward the target and, at the same time, place the trigger finger on the trigger, acquire sight alignment and sight picture within the aiming area, and apply trigger pressure until the shot is fired.

M7 Shoulder Holster

The M9 service pistol fits very snugly in the M7 shoulder holster because the holster was originally designed for the M1911A1 .45-caliber pistol, which has a more slim, round design, particularly around the trigger guard. A firm grip is required when holstering and withdrawing the M9 service pistol from the M7 shoulder holster. To present the pistol from the M7 shoulder holster, perform the following steps:

- Unsnap the thumb snap closure with the left hand.
- Wrap the fingers of the right hand around the pistol grip and rest the thumb on top of the inside of the holster. See figure 6-3.

Figure 6-3. Presentation From the M7 Shoulder Holster—Step 1.

- Grasp the pistol grip firmly and draw the pistol up and away from the holster while rotating the thumb in a position to operate the safety.
- Continue withdrawing the pistol until the muzzle clears the holster and rotate the muzzle toward the target. See figure 6-4.

Figure 6-4. Presentation From the M7 Shoulder Holster—Step 2.

- Sweep the safety with the thumb of the right hand while starting to punch the pistol out toward the target.
- Establish a two-handed grip on the pistol by joining the right hand with the left hand in the center of the torso. See figure 6-5.
- Continue punching the pistol out and, at the same time, place the trigger finger on the trigger, establish sight alignment and sight picture within the aiming area, and continue trigger pressure until the shot is fired.

Assault Holster

To present the pistol from the assault holster, perform the following in one, continuous motion:

Figure 6-5. Presentation From the M7 Shoulder Holster—Step 3.

- Bring the heel of the hand down on the hammer of the pistol so that it disengages the thumb break. See figure 6-6.
- Sweep the hand forward in a small circular motion, slide the hand up the holster, and bring the fingers up under the pistol grip.

  Note: Depending on the type of retention strap, this circular motion releases the retention strap or pushes the retention strap forward and out of the way.

Figure 6-6. Presentation From the Assault Holster—Step 1.

- Grasp the pistol grip and draw the pistol straight up and out of the holster while establishing a firing grip and positioning the thumb on the safety to operate it. See figure 6-7.

Figure 6-7. Presentation From the Assault Holster—Step 2.

Concealed Pistol Holster

Depending on the clothing worn by the Marine, there are two methods for accessing the concealed pistol holster so that the clothing does not become an obstruction while presenting the pistol. To present the pistol from the concealed pistol holster, the following steps are performed in one, continuous motion when the target appears:

- If the Marine is wearing a short jacket/sweater (waist-level) that is buttoned or zipped—
  - Move the left hand across the body and grasp the jacket or sweater just above the holster, at the same time place the right hand on the holster below the jacket or sweater. See figure 6-8 on page 6-6.
  - Pull up on the jacket or sweater with the left hand. At the same time, slide the right hand up the holster until the fingers come in contact with the pistol grip. Keep the thumb above the pistol to ensure the jacket or sweater clears the pistol. See figure 6-9 on page 6-6.

  Note: Leaning slightly forward at the waist may assist in clearing the jacket or sweater from the pistol and in removing the pistol from the holster.

- If the Marine is wearing a long jacket (below waist-level), or a short jacket or sweater that is unfastened—
  - Place the heel of the left hand at the center of the torso to hold the left side of the jacket down with the fingers extended. At the same time, place the right hand on the right side of the jacket, with the thumb underneath the right side of the jacket below the left hand. See figure 6-10 on page 6-7.
  - Keep thumb of the right hand against the body and throw the jacket back and away from the holster. See figure 6-11 on page 6-7.

  Note: Keeping a weighted object (e.g., keys, extra magazine) in the right-hand pocket of the jacket assists in throwing the jacket back and away from the holster.

  - Place the right hand on the holster and slide the hand up the holster until the fingers come in contact with the pistol grip.
- Grasp the pistol grip with the fingers and draw the pistol straight up. Continue withdrawing the pistol while moving the thumb to a position on the safety.

  Note: Hand placement should allow the firing grip to be established once the thumb disengages the safety. Any adjustments made to the firing grip after the safety is disengaged should be minor.

- Rotate the muzzle forward, once it clears the holster, while sweeping the safety.
- Establish a two-handed grip on the pistol by joining the left hand with the right hand in front of the torso. At the same time, start to punch the pistol out toward the target.

Figure 6-8. Presentation From the Concealed Pistol Holster—Step 1.

Figure 6-9. Presentation From the Concealed Pistol Holster—Step 2.

Figure 6-10. Presentation From the Concealed Pistol Holster with the Long Jacket—Step 1.

Figure 6-11. Presentation From the Concealed Pistol Holster with the Long Jacket—Step 2.

- Continue punching the pistol out and, at the same time, place the trigger finger on the trigger, acquire sight alignment and sight picture within the aiming area, and apply trigger pressure until the shot is fired.

Presentation While Assuming the Kneeling Position

In combat, the Marine must be able to quickly assume the kneeling position while presenting the pistol to the target. This usually takes advantage of cover and provides a more stable base for shooting. The following procedures are based on the Isosceles and Weaver variations of the standing to the kneeling shooting positions.

From the Ready

The Marine drops to the kneeling position while raising the arms to bring the pistol up to the target.

Note: The Weaver variation maintains the body's position in a 40 to 60 degree oblique to the target.

At the same time, the Marine sweeps the safety with the thumb of the right hand, places the trigger finger on the trigger, acquires sight alignment and sight picture within the aiming area, and applies trigger pressure until the shot is fired.

From the Alert (Arms Straight)

The Marine drops to the kneeling position while raising the arms to bring the pistol up to the target.

Note: The Weaver variation maintains the body's position in a 40 to 60 degree oblique to the target.

At the same time, the Marine sweeps the safety with the thumb of the right hand, places the trigger finger on the trigger, acquires sight alignment and sight picture within the aiming area, and applies trigger pressure until the shot is fired.

From the Alert (Close Quarters, Elbows Bent)

The Marine drops to the kneeling position while pushing the arms out toward the target.

Note: The Weaver variation maintains the body's position in a 40 to 60 degree oblique to the target.

At the same time, the Marine sweeps the safety with the thumb of the right hand, places the trigger finger on the trigger, acquires sight alignment and sight picture within the aiming area, and applies trigger pressure until the shot is fired.

From the Holster Transport

The Marine withdraws the pistol from the holster while dropping to the kneeling position. The pistol should be rotated to the target by the time the knee hits the deck. The Marine sweeps the safety with the thumb of the right hand, establishes a two-handed firing grip and—

- In the Weaver variation, raises the arms to bring the pistol up toward the target.
- In the Isosceles variation, pushes the pistol out toward the target.

At the same time, the Marine places the trigger finger on the trigger, acquires sight alignment and sight picture within the aiming area, and applies trigger pressure until the shot is fired.

Presentation While Assuming the Prone Position

The prone position is generally assumed to take advantage of cover or to provide additional stability for shooting. The following procedures are executed from the standing holster transports.

Isosceles Prone

The Marine withdraws the pistol from holster. At the same time, the Marine eliminates body contact with the deck by either the squat method or the drop method. The pistol is rotated to the target as the left hand is placed on the deck. The Marine sweeps the safety off.

Note: If the Marine wishes to thumbcock the pistol for a single action shot, it is done once the Marine is on the deck.

The Marine establishes a two-handed firing grip while spreading the legs a comfortable distance apart for stability. He places the trigger finger on the trigger, acquires sight alignment and sight picture within the aiming area, and applies trigger pressure until the shot is fired.

Weaver Prone

The Marine withdraws the pistol from the holster. At the same time, the Marine eliminates body contact with the deck by either the squat method or the drop method. The Marine maintains the 40 to 60 degree oblique to the target. The pistol should be rotated to the target as the left hand is placed on the deck. The Marine sweeps the safety off.

Note: If the Marine wishes to thumbcock the pistol for a single action shot, it is done once the Marine is on the deck.

The Marine brings the left knee up, establishes a two-handed firing grip, and places the left elbow on the deck for stability. He places the trigger finger on the trigger, acquires sight alignment and sight picture within the aiming area, and applies trigger pressure until the shot is fired.

Search and Assess

To be successful in combat, the Marine must have the ability to assess the situation and take appropriate action following engagement. Once the Marine fires one or two rounds to engage a target, he must quickly assess the situation and the effectiveness of his engagement. This split-second assessment allows the Marine to determine the best course of action and prevents him from expending a number of rounds without

assessing the results and his ability to accurately engage the target.

To search and assess, perform the following steps in sequence:

- Place the trigger finger straight along the receiver immediately after a target is engaged. Do not place the pistol on safe.
- Lower the arms just enough to look over the pistol sights and provide a clear field of view. Do not rotate the wrists in order to angle the pistol downward, this breaks the firing grip and changes the tension in the arms. Lowering the arms maintains the firing grip, keeps the sights level, and allows sight alignment and sight picture to be quickly re-established should follow-on shots need to be fired.
- Search the area by moving the head, eyes, and pistol left and right (approximately 45 degrees from center). Wherever the head moves, the muzzle moves (eyes, muzzle, target). Keeping both eyes open increases the field of view.

If the target has not been eliminated, the Marine must determine whether to re-engage the target:

- If the Marine decides to re-engage the target, the target's size, time and distance to the target, and Marine's capabilities dictate the technique used. Re-engagement techniques include re-engaging the target with a well-aimed precision shot, two shots, or offset aiming.
- If the target's distance exceeds the Marine's engagement capabilities or if the target is partially exposed and too small for the Marine to accurately engage, the Marine should not attempt to re-engage the target. The Marine may seek cover, seek out a better opportunity for engagement, or use support to better stabilize the pistol.

When it is determined that the area is clear of all enemy threat, place the pistol on safe without breaking the grip and assume a pistol carry or pistol transport.

CHAPTER 7
PISTOL ENGAGEMENT TECHNIQUES

The Marine must be able to quickly detect targets and employ the proper pistol engagement and firing techniques. The Marine must also be able to re-engage a target if the initial engagement is not successful.

Note: The procedures in this chapter are written for right-handed Marines; left-handed Marines should reverse directions as needed.

Target Detection

Target indicators reveal an enemy's position. Most combat targets are detected by smoke, flash, dust, noise, or movement and are usually only momentarily visible. Target indicators are grouped into three general areas: movement, sound, and improper camouflage.

Movement

The Marine does not need to look directly at an object to notice movement. The eye is attracted to any movement, especially sudden movement. A slowly moving target is harder to detect than one with quick, jerky movements. Therefore, the ability to locate a moving target depends primarily on the speed of the object's movement.

Sound

Sound (e.g., movement, rattling equipment, talking) can be used to detect an enemy position. Sound provides only a general location, making it difficult to pinpoint a target by sound alone. However, sound can alert the Marine to the presence of a target and increases the probability of locating the target through other indicators.

Improper Camouflage

The improper use of camouflage creates three target indicators: shine, outline, and contrast with the background. The closeness of a typical pistol engagement somewhat diminishes these effects, but can still affect target detection. The Marine's ability to recognize target indicators aids in the detection of targets.

Shine

Shine is created from reflective objects such as metal, glass, pools of water, and the skin's natural oils. Shine acts as a beacon in locating a target's position.

Outline

The outline of camouflaged objects such as the body, head and shoulders, weapons, and gear can be recognizable.

Contrast With the Background

Objects contrast with a background because of differences in color, surface, and shape. The following are examples of objects contrasting with their background:

- A target wearing a dark uniform would be clearly visible in an area of snow or sand.
- Symmetrical shapes, such as helmets or rifle barrels, can be detected in a wooded area.
- Fresh soil around a fighting hole contrasts with the otherwise unbroken ground surface.

While observing an area, the Marine notes anything that looks out of place or unusual and studies it in more detail in order to increase the chances of spotting a hidden threat.

Techniques of Fire

To successfully engage a combat target with the M9 service pistol, the Marine must employ effective techniques of fire. The Marine's performance of these skills and the proper application of the fundamentals of marksmanship are critical to success in a combat situation.

Double and Single Action Firing

When the M9 service pistol is taken off safe, it is capable of firing in both a double and a single action mode.

Double Action Mode

The design of the M9 service pistol causes the first shot fired to be a double action shot.

In double action firing, two actions occur as the trigger is moved to the rear; the hammer moves to the rear, cocking the pistol, and then the hammer moves forward, firing the pistol. More pressure is required on the trigger to fire a double action shot due to the distance between the trigger and hammer and the weight of the trigger. A double action shot requires approximately 9 to 16 pounds of pressure to move the trigger rearward.

Maintaining sight alignment and sight picture are harder when firing a double action shot. Therefore, the sights will more than likely move outside the aiming area when applying trigger pressure.

Single Action Mode

In single action firing, the pistol is already cocked because the cycle of operation in the first double action shot leaves the hammer cocked to the rear. Therefore, the only action taking place as the trigger is moved to the rear is the hammer moving forward, firing the pistol. A single action shot requires approximately 4 to 6 pounds of pressure to move the trigger rearward. Therefore, the application of trigger control is easier when firing a single action shot.

To enable the first shot to be fired single action, the pistol's hammer can be manually cocked with the thumb:

Note: The pistol must be taken off safe before it can be thumbcocked.

- Use the left thumb to pull back on the hammer to cock it. This ensures that the firing grip of the right hand does not have to be broken.
- Ensure that the hammer moves all the way to the rear.
- Ensure the trigger finger remains straight along the receiver until the pistol is fully cocked.
- Re-establish the firing grip with both hands once the pistol is cocked.

Single Action or Double Action Firing Factors

The decision to fire in a single or double action mode is made rapidly. Ultimately, the decision is based on the Marine's abilities, but the decision is also based on time and accuracy. The pistol is fired in the double action mode when trigger control, sight picture, and stability of hold are not as critical for accuracy (i.e., close range, large targets). The pistol is fired in the single action mode when the fundamentals are more critical to accuracy (i.e., long range, small targets).

Time

The Marine sacrifices time to fire a single action, precision shot; but what he sacrifices in time, he gains in accuracy.

For quick engagements at close range, there may not be time to thumbcock the pistol for a single action shot. Therefore, firing the first shot in the double action mode is preferred because shots are needed on target quickly and stability of hold and sight picture are not as critical to accuracy.

When time permits and for targets at longer ranges, the pistol may be thumbcocked to place it in the single action mode to reduce the weight of the trigger and the distance the trigger must travel rearward to fire the first shot.

Distance and Size of the Target

The smaller the target, the more critical the application of the fundamentals in order to engage the target accurately. To accurately engage a small target (e.g., head shot, long-range target) it is better to thumbcock the pistol for a single action shot. Engagement of a smaller target requires additional precision because sight alignment and sight picture are more critical to accuracy.

Two-Shot Technique

During combat, the preferred pistol engagement technique is to rapidly fire more than one shot on a target to eliminate it as a threat. Two shots fired in rapid succession increase the trauma (i.e., shock, blood loss) on the target and increase the Marine's chances of quickly eliminating the threat. Therefore, two shots are most often fired in rapid succession on a target at close range.

After the pistol is fired, the muzzle climbs with the recoil of the pistol. To fire two shots, the Marine must quickly recover the sights to the same area on the target while re-acquiring sight alignment and sight picture. The proper recovery automatically brings the sights back on target following recoil. A quick recovery allows more time for the Marine to align the sights and apply trigger control to fire the next shot. Recovery begins immediately after the application of the fundamentals to bring the pistol sights into alignment with the target in preparation for firing the next shot.

The amount the muzzle climbs during recoil depends on the amount of controlled muscular tension in the grip and wrists used to stabilize the pistol and create consistency in resistance to recoil. Controlled muscular tension allows the pistol sights to recover consistently back on target within a minimum amount of time. The speed of delivery of multiple shots depends on how fast the Marine can re-acquire sight alignment. Sight recovery is determined by the following:

- The key to proper recovery is a stable firing position and proper grip.
- If the Marine's firing position is not stable, recoil forces him out of his firing position, requiring him to re-establish his position before he takes his next shot.
- An improper grip or lack of controlled muscular tension causes the pistol to move in the Marine's hand after the shot is fired, disrupting sight alignment and requiring the Marine to re-establish his grip.

Slow Fire Technique

Sight alignment becomes more critical the smaller the target and the greater the distance to the target. In these situations, the Marine does not engage the target with two rapidly fired shots because he has to slow down his application of the fundamentals in order to fire a precision shot(s). To engage small targets (i.e., partially exposed) and targets at longer ranges where precision is required, the Marine must employ the following slow fire technique:

- Thumbcock the pistol for a single action shot.
- Slow down application of the fundamentals.
- Fire one well-aimed, precision shot on target.

Re-engagement Techniques

Once the Marine has quickly assessed the situation and determined that the threat still exists, he may make the decision to re-engage the target to eliminate it as a threat. Re-engagement techniques include engaging the target with a precision shot through slow fire, two shots, or offset aiming. The time, size, and distance to the target as well as the Marine's marksmanship abilities dictate the technique used to re-engage the target.

Slow Fire Technique

If the Marine has engaged a target and the target still poses a threat, the Marine may choose to slow down his application of the fundamentals

and fire a slow fire, precision shot. The placement of one well-aimed, precision shot on a designated area of the target increases the chances of eliminating the target as a threat. However, the time the Marine has to engage the target determines if he can slow down his application of the fundamentals to fire a precision shot. Firing a precision shot takes time, so the Marine will sacrifice time for accuracy.

The key to successful shot placement is the Marine's ability to slow down his performance and focus on the application of the fundamentals of marksmanship. The Marine must determine where to place shot for maximum effectiveness. In order to make this decision, the Marine must consider distance and size of the target and time. For targets at close range and within the Marine's marksmanship abilities, a precision shot is placed in the head to immediately eliminate the target as a threat. Sometimes, even at close ranges, the target may only be partially exposed; therefore, the Marine is presented with a small target and aims his sights on the portion of the target that is exposed. For targets at long ranges, the target is smaller and requires a precision shot. A precision shot may be placed in the body to add trauma to the target and increase the chances of eliminating the target as a threat.

Two-Shot Technique

If a target is accurately engaged, but does not go down, the Marine may re-engage the target with additional shots. Two additional, rapidly delivered shots increases the trauma and increases the Marine's chances of eliminating the threat.

The size and distance to the target affect how quickly two shots can be delivered on the target. The speed at which two shots are fired also depends on the Marine's marksmanship abilities and how fast he can re-acquire his front sight. However, the Marine must not compromise accuracy for speed; the key to successful target engagement is to fire only as quickly as the Marine can fire effectively.

Offset Aiming

When the Marine assesses the situation and determines his shots are not successful and not striking the target in the designated aiming area, he may employ offset aiming. Since the pistol's sights cannot be adjusted, offset aiming is applied to adjust the aiming area and to cause rounds to strike center mass. This technique should only be applied when the Marine determines that he is applying the fundamentals of marksmanship correctly. Sight picture will change as the aiming area is adjusted.

The known strike of the round offset aiming technique requires shifting the point of aim to compensate for rounds striking off target center. To effectively engage a target using this technique, the Marine must be able to see where the rounds are striking and then aim an equal distance from the center of the aiming area opposite the observed strike of the round. For example, if the rounds are striking the target high and left of center mass, aim an equal and opposite distance low and right.

Multiple Targets

If engaging more than one target at a time, the Marine adheres to the fundamentals of marksmanship and employs the techniques of multiple target engagement. The introduction of multiple targets in a combat scenario requires additional skills that must be learned and practiced if a Marine is to be successful. To be effective in combat, the Marine must be able to detect targets through identification of target indicators (identified on page 7-1), prioritize the targets, and employ multiple target engagement techniques.

Combat Mindset

Successful engagement of multiple targets requires a somewhat different mindset from single target engagement. For example, following engagement of a single target, the Marine assesses

the situation. During multiple target engagements, after the first target is engaged, he must immediately engage the next target and continue until all targets have been eliminated. Because split-second decisions must be made, the development of a combat mindset is important to success on the battlefield. A combat mindset allows the Marine to control the pace of the battle rather than react to the threat.

Mental preparedness is essential to successful engagement of multiple targets, and the required mindset must be developed until it becomes second nature to the Marine. When multiple targets appear, the Marine must prioritize the targets to establish an engagement sequence. To prioritize targets and establish an engagement sequence, the Marine must be aware of the surroundings, not focus on one target, and continuously search the terrain for additional targets.

Prioritizing Targets

Once multiple targets have been identified, they must be prioritized in terms of the threat each target presents. While the fundamentals of marksmanship must still be applied, prioritizing targets and planning the engagement are just as essential to successful multiple target engagement.

Target priority is based on factors such as proximity, threat, and opportunity. It also encompasses the Marine's proficiency level since a Marine should not attempt to engage a target beyond his proficiency level or the pistol's capability (e.g., a target 100 yards away). The principal method of prioritizing targets is to determine the level of threat for each target so that all targets may be engaged in succession, starting with the most threatening and ending with the least threatening.

Prioritizing targets is an ongoing process. As the engagement proceeds, new targets may appear or previously identified targets may take cover, delaying their engagement. Therefore, the Marine must remain constantly alert to changes in target threat, proximity, and the opportunity for engagement and revise target priorities accordingly.

Engaging Multiple Targets

Once targets have been prioritized, the Marine must quickly eliminate them. It is crucial to understand and practice the physical techniques for engaging multiple targets until they become second nature. When these techniques occur as automatic responses, the Marine maintains an awareness of the complete battlefield and is able to concentrate on the mental aspects of multiple target engagement.

Engagement Methods

The fundamentals of marksmanship are critical to the development of skills to support multiple target engagement. While responsiveness is important when engaging multiple targets, the Marine's primary concern is to place accurate rounds on target. A balance must be struck between placing shots quickly on targets at close range and slowing down to place precision shots on targets at long range because all targets pose a threat and must be accurately engaged. To engage multiple targets—

- Engage every target, move from target to target.
- After all of the targets have been initially engaged, assess the effectiveness of the engagements and, if necessary, re-engage targets that still pose a threat.
- If all of the targets are eliminated, search the area for new targets.

Considerations for Field Firing Positions

The selection and use of field firing positions are critical to engagement of multiple targets. As in any firing situation, if the situation permits, the Marine should make a quick mental review of the terrain to select a firing position that provides stability, mobility, and observation of the enemy. The firing position should also provide flexibility for engaging multiple targets. The more dispersed the multiple targets, the greater the lateral movement the position must afford to engage them.

The prone position provides the maximum stability for firing well-placed shots, but engaging multiple targets from this position may require

adjustment in the position from shot to shot depending on the distance between the targets and their location. Because the arms are fully extended on the ground, the prone position can be restrictive, increasing the time it will take to recover the sights onto subsequent targets. If the Marine must make an adjustment in the prone position to engage multiple targets, he must ensure that he maintains proper arm placement. Improper arm placement may affect his stability of hold and his ability to acquire sight picture. The following identifies position adjustments:

- For targets that are not widely dispersed, the Marine adjusts the position of the lower part of the body to orient the upper body toward the target without disturbing the placement of the arms. This allows the Marine to maintain stability of hold and quickly recover on subsequent targets. Moving the legs to the left orients the upper body to the right; moving the legs to the right orients the upper body to the left.
- For targets that are widely dispersed, the Marine may need to adjust his entire position to orient his body in the direction of subsequent targets. Using the left hand, push the upper body off the deck just high enough to move the body in the direction of the target. Extend the right arm toward the target and keep the muzzle pointed in the direction of the target.

The kneeling and standing positions provide an increased field of view and allow maximum lateral adjustment to engage dispersed targets. The type of adjustment the Marine must make in the kneeling or standing position in order to orient his body in the direction of each target is related to the distance between the targets. It is also related to the Marine's ability to maintain stability of hold and recover from recoil. Once the first target is engaged—

- Maintain a proper shooting position, rotate the body in the direction of the target, keeping the feet in place. In the standing position, the Marine may bend slightly at the knees while rotating the body. This allows the Marine to distribute his weight forward to provide additional stability to the position and to better control the effects of recoil.
- Adjust the entire position by either adjusting the placement of the feet or knee(s) in order to face in the direction of the new target if the targets are some distance apart.
- Ensure that as the eyes move to a new target, the head and pistol muzzle should follow.

Moving Targets

The majority of combat targets will be moving; the enemy will move quickly from cover to cover, exposing himself for the shortest time possible. Therefore, a moving target must be engaged before it disappears. The Marine must engage a moving target with the same accuracy and precision used to engage a stationary target. Practice in the proper application of leads and the fundamentals of marksmanship enable the successful engagement of moving targets.

Types of Moving Targets

Moving Target

This type of target moves in a consistent manner (i.e., walking or running) and is in continuous sight as it moves across the Marine's field of vision. However, unless the enemy is completely unaware of the Marine's presence, this type of target is not likely to present itself.

Stop and Go Target

This type of target appears and disappears during its movement due to intermittent cover. It will present itself for only a short period of time before re-establishing cover. This type of target is most vulnerable to fire at the beginning and end of its movement because it begins slow and gains momentum as it leaves cover and then slows to avoid overrunning the new cover.

Leads for Moving Targets

Once the moving target has been identified it must be engaged. To engage a moving target, the Marine must aim at a point in front of the target, which is known as a lead. Lead is the distance in advance of the target that is required to strike the target when it is moving. To achieve success, determining the amount of lead to engage a moving target must be as precise as possible. When a shot is fired at a moving target, the target continues to move during the time of the bullet's flight. For this reason, the aim must be in front of the target; otherwise, the shot will fall behind the target.

Factors Affecting Lead

Factors that affect the amount of lead are the target's range, speed, and angle of movement.

Range. There is a time lag from the time a round is fired until the round strikes at the point of aim. This time of flight could allow a target to move out of the bullet's path if the round were fired directly at the target. Time of flight increases as range to the target increases. Therefore, the lead must be increased in proportion to the distance to the target.

Speed. A greater lead is required to hit a running man than a walking man because the running man moves a greater distance during the flight of the bullet.

Angle of Movement. The angle of target movement also affects the amount of lead required for target engagement. The angle of movement across the Marine's line of sight relative to the flight of the bullet determines the type (amount) of lead.

Types of Leads

Full Lead. The target moves straight across the Marine's line of sight with only one arm and half the body visible. This target requires a full lead because it moves the greatest distance across the Marine's line of sight during the bullet's flight.

Half Lead. The target moves obliquely across the Marine's line of sight (at about a 45-degree angle). One arm and over half of the back or chest are visible. This target requires half of a full lead because it moves half as far as a target moving directly across the Marine's line of sight during the bullet's flight.

No Lead. A target moving directly toward or away from the Marine presents a full view of both arms and the entire back or chest. No lead is required. This target is engaged in the same manner as a stationary target because it is not moving across the Marine's line of sight.

Point of Aim Technique

To engage a moving target, a Marine establishes a lead using a point of aim offset aiming technique. This technique uses predetermined points of aim to sector a man-sized target vertically, halfway between center mass and the leading edge of the target (both one point of aim and two points of aim) (see fig. 7-1 on page 7-8). The same units of measure can be applied off the target for holds of additional points of aim. To use the point of aim technique to establish a lead on a man-sized moving target at various ranges, speeds, and angles of movement, the following guidelines apply. See figure 7-2 on page 7-9.

- For a target moving at a distance of 15 yards away or less, no lead is required.
- For a target walking directly across the Marines line of sight (full lead) between 16 and 25 yards away, hold 1 point of aim in the direction the target is moving.
- For a target running directly across the Marine's line of sight (full lead) between 16 and 25 yards away, hold 2 points of aim in the direction the target is moving.

Methods of Engagement

Moving targets, although difficult, can be engaged by the tracking or ambush method or a combination of the two. See figure 7-2 on page 7-9.

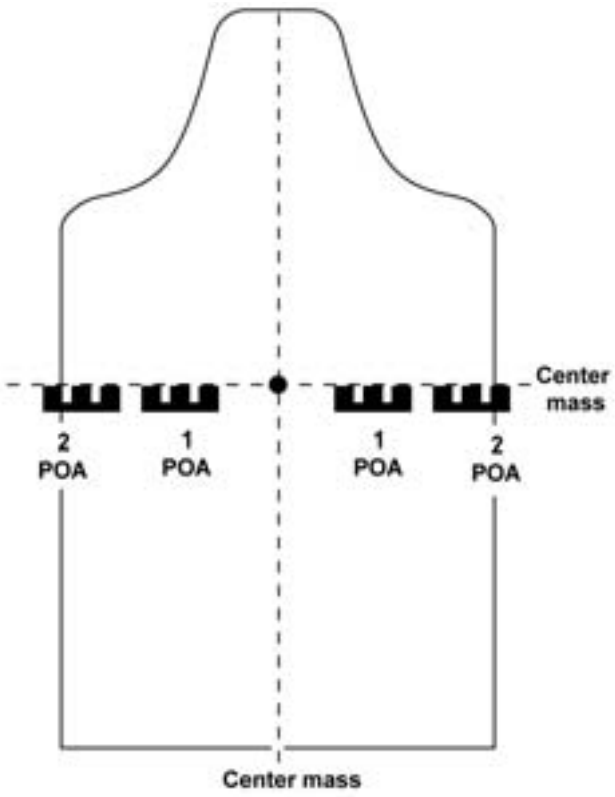


Figure 7-1. Points of Aim.

Tracking Method

In this method, the Marine "tracks" or follows the target with his front sight while maintaining sight alignment and a point of aim on or ahead of (leading) the target until the shot is fired. Sight picture is the aiming point in relation to the target while maintaining sight alignment (when a lead is established in moving target engagement, the sights are not entered on the target). To execute the tracking method—

- Thumbcock the pistol while presenting it to the target.
- Track the muzzle of the pistol through the target to the desired point of aim (lead). The point of aim may be on the target or some point in front of the target depending upon the target's range, speed, and angle of movement.
- Track and maintain focus on the front sight while applying trigger pressure and acquiring sight alignment.
- Continue tracking and applying trigger pressure while acquiring sight picture. When sight picture is established, engage the target while maintaining the proper point of aim (lead).
- Follow through so the lead is maintained as the bullet exits the muzzle. Continuing to track also enables a second shot to be fired on target.

Ambush Method

The ambush method is generally used to engage a stop and go target and when it is difficult to track the target with the pistol, such as in the prone position. With this method, the pistol is aimed at a predetermined engagement point ahead of the target and along its path, allowed to remain stationary, and fired when the target reaches the predetermined engagement point. The engagement point is based on the required point of aim (lead) to engage the target effectively. When the sights are settled, the target moves into the predetermined engagement point creating the desired sight picture. Once sight picture is established, the remaining pressure is applied on the trigger until the shot is fired. To execute the ambush method—

- Look for a pattern of exposure.
- Thumbcock the pistol while presenting it to a selected point of aim ahead of the target.
- Apply trigger pressure while obtaining sight alignment in the aiming area.
- Continue applying trigger pressure and hold sight alignment until the target moves into the predetermined engagement point and the desired sight picture is established.
- Engage the target once the sight picture is acquired.
- Follow through so the pistol sights are not disturbed as the bullet exits the muzzle.

Applying the Fundamentals of Marksmanship

The engagement of moving targets is a perishable skill that must be practiced frequently if it is to be maintained. The Marine must practice to develop the skill to calculate the point of aim (lead) and

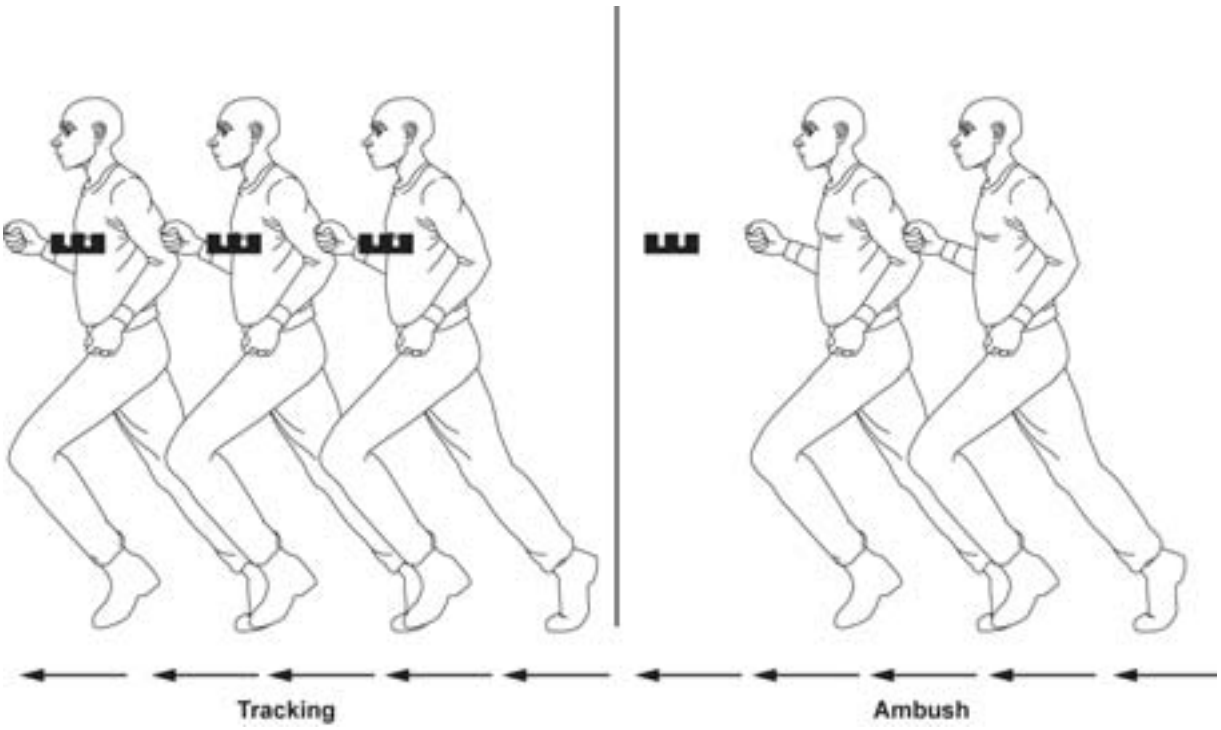


Figure 7-2. Moving Target Engagement Methods.

fire the shot while maintaining the proper point of aim (lead).

To engage moving targets using the tracking method, the Marine moves the pistol smoothly and steadily as the target moves. A stable position and firm grip are necessary to steady the pistol sights while tracking.

When using the tracking method, continue tracking the target while following through with the shot process so the point of aim (lead) is maintained as the bullet exits the muzzle. Continuing to track also enables a second shot to be fired on target if necessary. Concentration should be on continuing to track while applying the fundamentals. The fundamentals must be instinctively applied, allowing concentration on tracking the target and applying point of aim (lead).

Aiming

Sight alignment remains unchanged for accurate engagement of a moving target. The most common error when engaging moving targets is to focus on the target rather than focusing on the front sight. Sight picture is the point of aim in relation to the target while maintaining sight alignment. For both the ambush and tracking methods, sight picture is changed from the normal center mass picture, based on range, speed, and angle of movement of the target. It takes practice in moving target engagement to quickly establish the desired sight picture for a given point of aim (lead).

Breath Control

There is no difference in breath control when engaging moving targets; the breath is held to fire the shot.

Trigger Control

Trigger control is critical to firing shots while establishing and maintaining sight alignment and sight picture. Because the single action mode is the preferred method of engaging a moving target,

the pistol is thumbcocked before trigger control is applied. The following guidelines apply:

- Do not use interrupted trigger control when engaging moving targets because the point of aim (lead) is lost or has to be adjusted if the trigger is held in order to re-assume the proper sight picture.
- Do not stop tracking as trigger control is applied. This causes the shot to impact behind the moving target. Trigger control should be uninterrupted while maintaining the point of aim so the trigger is pulled in one continuous, smooth motion to the rear.
- Do not interrupt trigger control when the target is masked from view. This is particularly true in the ambush method for targets that appear to stop and go when moving to and from cover. Trigger control should be uninterrupted.

CHAPTER 8
ONE-HANDED TECHNIQUES

In combat, a situation may arise where the Marine must engage a target by using only one hand. A Marine fires the pistol one-handed when—

- The Marine's other hand is occupied.
- A target presents itself so quickly and at a close range that the Marine does not have time to establish a two-handed grip and position.
- One of the Marine's hands is injured.

Note: The procedures in this chapter are written for right-handed Marines; left-handed Marines should reverse directions as needed.

Presentation and Shooting

Adjustment of the Standing Position

To fire accurately, the Marine must maintain the same stability and control of the pistol, manage recoil, and recover on target as effectively with one hand as with two. This is accomplished by adjusting the standing position as the pistol is presented to the target (see fig. 8-1).

The Marine's angle to the target determines what adjustments are made to the standing position. This adjustment is made while the pistol is being presented to the target by moving or sliding the feet to orient the body to the target. For stability and balance, the right foot may be slightly forward of the left foot. The further to the right of the Marine the target is the farther forward the right foot will be. To adjust the standing position when firing one-handed—

- Increase the muscular tension in the right arm and bend the elbow slightly to better manage the pistol.

Note: For some Marines, muscular tension in the firing arm and the position of the body in relation to the target causes them to cant the pistol inboard slightly. A slight inboard cant of the pistol and firing arm allows a natural bend in the elbow and allows a better management of recoil and recovery of the sights back on target. Any cant should be natural and not caused by excessive muscular tension. A slight cant does not affect shooting performance and should not alter the application of the fundamentals of marksmanship.

- Apply controlled muscular tension throughout the body to better manage the effects of recoil.
- Lean forward aggressively, roll the shoulders forward, and tuck the head into the shoulders.

Figure 8-1. One-Handed Presentation.

Note: The following step is done only during training to demonstrate how to stabilize the position and to simulate the Marine's other hand being occupied.

- Place the left hand in a fist on the center of the torso to increase stability. If the left arm is swinging freely it causes a corresponding movement in the pistol, reducing stability and control. Placing the left hand on the torso also ensures it is not covered by the muzzle of the pistol as the pistol is presented.

Searching and Assessing After Firing

Following one-handed target engagement, the Marine must quickly decide if it is to his advantage and if it is possible to free his occupied hand in order to place both hands on the pistol to search and assess. Whenever possible, the Marine places both hands on the pistol to increase stability and to be ready for re-engagement if necessary.

Reloading

Dry Reload

When only one hand is available, the dry reload can be performed as follows:

- Seek cover, if the situation permits.
- Press the magazine release button and allow the magazine to fall to the deck. If using the right hand, press the magazine release button with the thumb. If using the left hand, press the magazine release button with the trigger finger.
- Point the muzzle in a safe direction and position the pistol to facilitate loading the magazine. Depending on the firing position, this is accomplished using one of the following methods:
  Two-Knee Kneeling Position
  - Rotate the pistol so the magazine well faces up and the muzzle of the pistol is pointed away from the body.
  - Place the pistol between the thighs or knees and apply pressure to hold the pistol in place.
  - Withdraw a filled magazine from the ammunition pocket and insert it into the magazine well, seating it with the heel of the hand. See figure 8-2.

Figure 8-2. One-Handed Dry Reload: Two-Knee Kneeling Position.

Standing Position

- Rotate the pistol so the magazine well faces up and the muzzle of the pistol is pointed away from the body.
- Place the pistol between the thighs or knees and apply pressure to hold the pistol in place. Bend slightly at the knees to secure the pistol between the thighs.
- Withdraw a filled magazine from the ammunition pocket and insert it into the magazine well, seating it with the heel of the hand. See figure 8-3.

Kneeling Position (High, Medium, Low)

- Rotate the pistol so the magazine well faces outboard and the muzzle is pointed away from the body.
- Place the rear portion of the slide in the bend of the right knee and apply pressure with the leg to hold the pistol in place. For additional control, the Marine may drop to a two-knee kneeling position and place the pistol between his knees.
- Withdraw a filled magazine from the ammunition pocket and insert it into the magazine well, seating it with the heel of the hand. See figure 8-4 on page 8-4.

Prone Position

- The Marine places the pistol on the deck in front of him and against his body with the muzzle pointed in a safe direction. Alternately, the Marine may roll on his side and place the pistol between his knees, with the magazine well facing out.
- Withdraw a filled magazine from the ammunition pocket and insert it into the magazine well, seating it with the heel of the hand. See figure 8-5 on page 8-4.

- Grasp the pistol grip and remove the pistol from its secured location or from the deck.
- Press the slide release to allow the slide to move forward and chamber a round. If using the right hand, press the slide release with the thumb. If using the left hand, press the slide release with the index finger.

Figure 8-3. One-Handed Dry Reload: Standing Position.

Figure 8-4. One-Handed Dry Reload: Kneeling Position.

Condition 1 Reload

When only one hand is available, a Condition 1 reload can be performed as follows:

- Point the muzzle in a safe direction and position the pistol to allow for removal of the magazine (e.g., between the thighs, in the bend of the knee, in the holster, tucked in the cartridge belt, on the deck against the body). Any position is correct if it allows the magazine well to be exposed.
- Withdraw a filled magazine from the ammunition pocket.
- Press the magazine release button and remove the magazine from the pistol. If using the right hand, press the magazine release button with the thumb. If using the left hand, press the magazine release button with the index finger.
- Insert the filled magazine into the magazine well, seating it with the heel of the hand.
- Stow the partially-filled magazine (e.g., inside the cartridge belt, in the cargo pocket).
- Grasp the pistol grip and remove the pistol from its secured location, keeping the trigger finger straight and off the trigger until ready to fire.

Remedial Action

Remedial action requires investigating the cause of the stoppage, clearing the stoppage, and returning the pistol to operation. When performing remedial action, seek cover if the tactical situation permits. Once a pistol ceases to fire, the Marine must visually or physically observe the pistol to identify the problem before it can be

Figure 8-5. One-Handed Dry Reload: Prone Position.

cleared. The steps taken to clear the pistol are based on what is observed:

- Remove the finger from the trigger and place it straight along the receiver.
- Lock the slide to the rear. To pull and lock the slide to the rear, push up on the slide stop and maintain pressure with the right thumb. (Push up on the slide stop with the left index finger if remedial action is being performed with the weak hand.)
- Secure the rear sight on the top of the cartridge belt or any other surface that provides the resistance needed to stabilize the pistol. See figure 8-6. While applying pressure on the pistol to keep the rear sight secured, push downward on the pistol in one continuous motion to lock the slide to the rear.

  Note: Ensure the pistol does not move to safe when locking the slide to the rear.

- Place the pistol in a position to observe the chamber.
- Correct the stoppage.

If there is a round in the magazine but not in the chamber, release the slide and observe a round being chambered. If you do not observe a round being chambered, tap, rack, and bang to perform remedial action:

Tap

- Keep muzzle pointed in a safe direction and place trigger finger straight along the receiver.
- Strike the bottom of the magazine against a hard surface to ensure it is seated. In the kneeling position, strike the magazine against the thigh (see fig. 8-7 on page 8-6). In the standing position, bring the right knee up while striking magazine against the right thigh (see fig. 8-8 on page 8-6). In the prone position, strike the magazine against the deck.

Figure 8-6. One-Handed Remedial Action.

Figure 8-7. Tap the Magazine Against the Knee: Kneeling Position.

Figure 8-8. Tap the Magazine Against the Knee: Standing Position.

Rack

- Rotate the pistol so the rear sight can be hooked on the top of the cartridge belt or any other surface (e.g., the edge of a table, wall, heel of the boot) that provides the resistance needed to rack the slide in a smooth, uninterrupted motion. Do not let the muzzle of the pistol cover the body. See figures 8-9 and 8-10.

Figure 8-9. Rack Slide Against Cartridge Belt.

Figure 8-10. Rack Slide Against Heel of Boot.

- Apply pressure on the pistol to keep the rear sight secured while pushing downward on the pistol to move the slide fully to the rear.
- Release pressure on the pistol to chamber the round.

Bang

- Recover the pistol on target, re-establish sight alignment/sight picture, and attempt to fire.

Presentation From the Holster With the Weak Hand

During combat, the Marine must be prepared to engage targets at any time. Therefore, the Marine must have the ability to present the pistol from the holster with his weak (left) hand if circumstances prevent him from using his strong (right) hand. He must apply the same smooth, controlled movement to present the pistol to the target. There are three methods for withdrawing the pistol from the holster with the weak hand. The Marine should practice each method to determine which works best for him.

Method One: Pistol Rotation

- Unfasten and release the D-ring with the left hand. See figure 8-11.

Figure 8-11. Method One: Release D-Ring.

- Wrap the fingers and thumb around the pistol grip so the index finger and thumb are around the base of the pistol grip. See figure 8-12.

Figure 8-12. Method One: Grasp the Pistol.

- Draw the pistol straight up until trigger guard clears the top of the holster. See figure 8-13.

Figure 8-13. Method One: Clearing Trigger Guard.

- Rotate the pistol so the magazine well faces the target and the trigger guard rests on the top of the holster. Ensure the trigger guard rests securely against the top of the holster. See figure 8-14 on page 8-8.

Figure 8-14. Method One: Rotating the Pistol.

- Maintain downward pressure on the pistol and slide the left hand around the pistol grip to establish a firing grip. See figure 8-15.

Figure 8-15. Method One: Establishing the Firing Grip.

- Grasp the pistol and continue to withdraw the pistol until the muzzle clears the holster and rotate the muzzle toward the target.
- Sweep the safety off with the thumb of the left hand while moving the pistol out toward the target. At the same time, place the trigger finger on the trigger and establish sight alignment and sight picture within the aiming area.
- Continue trigger pressure until the shot is fired.

Method Two: Hand Rotation

- Unfasten and release the D-ring with the left hand.
- Push the holster flap up and out of the way with the back of the left hand.
- Push the right hip out to facilitate grasping the pistol grip. Grasp the pistol grip between the holster flap and the pistol grip, the thumb is wrapped around the other side of the pistol grip against the backstrap. See figure 8-16.

Figure 8-16. Method Two: Grasping the Pistol.

Note: The cartridge belt may be pulled with the left hand to bring the holster closer to the body's center to facilitate grasping the pistol.

- Draw the pistol straight up while rotating the pistol so the magazine well faces inboard. Continue to remove the pistol until the trigger guard rests on the holster. See figure 8-17.
- Establish a firing grip and rotate the thumb to a position to operate the safety. See figure 8-18.
- Continue to withdraw the pistol until the muzzle clears the holster and rotate the muzzle to the target. See figure 8-19.
- Sweep the safety with the thumb of the left hand while moving the pistol out toward the

Figure 8-17. Method Two: Trigger Guard Rests on Holster.

Figure 8-18. Method Two: Establish Firing Grip.

target. At the same time, place the trigger finger on the trigger and establish sight alignment and sight picture within the aiming area.

- Continue trigger pressure until the shot is fired.

Method Three: Knee Placement

This method is particularly effective when firing from the two-knee kneeling position and the standing position.

Figure 8-19. Method Two: Rotating the Muzzle.

- Unfasten and release the D-ring with the left hand.
- Wrap the fingers and thumb around the pistol grip so the index finger and thumb are around the base of the pistol grip.
- Draw the pistol straight up until the muzzle clears the holster and rotate the muzzle forward. The magazine well should face upward.
- Place the pistol between the thighs, applying enough tension to keep the pistol in place. The Marine must ensure that he does not disengage the safety while performing this motion and that the muzzle of the pistol is clear of the body. In the standing position, the Marine bends slightly at the knees to facilitate securing the pistol between the thighs.
- Remove the left hand from the pistol grip and rotate the hand around the pistol grip to facilitate establishing a firing grip.
- Grasp the pistol grip and remove the pistol from the thighs, rotating the pistol until the muzzle is pointed toward the target.
- Sweep the safety with the thumb of the left hand while starting to punch the pistol out toward the target.
- Establish a firing grip and continue to punch the pistol out toward the target. At the same time, place the trigger finger on the trigger and

establish sight alignment and sight picture within the aiming area.

- Continue trigger pressure until the shot is fired.

Transferring the Pistol From One Hand to the Other

Situations may arise in combat where the Marine must transfer the pistol to the left hand to engage a target because the right hand or arm is injured. To safely transfer the pistol from one hand to the other, perform the following steps:

Note: This procedure is written to transfer the pistol from the right hand to the left hand.

- Point the muzzle in the direction of the target and place the trigger finger straight along the receiver. See figure 8-20.

Figure 8-20. Transferring the Pistol—Step 1.

- Place the web of the left index finger and thumb under the backstrap of the pistol. See figure 8-21.
- Wrap the fingers of the left hand around the pistol grip while releasing the right hand grip.

Figure 8-21. Transferring the Pistol—Step 2.

- Establish a firing grip with the left hand on the pistol. See figure 8-22.

Figure 8-22. Transferring the Pistol—Step 3.

CHAPTER 9
ADVANCED TECHNIQUES

Some tactical situations are quite complex and require Marines to apply advanced pistol engagement techniques in order to effectively engage the enemy and survive. The ability of the Marine to rapidly shoot on the move and to turn and fire will be critical to a successful engagement.

Note: The procedures in this chapter are written for right-handed Marines; left-handed Marines should reverse directions as needed.

Shooting on the Move

When moving from one area of cover to another, the Marine may engage a target that presents an immediate threat. In this situation, the Marine relies on accurate fire to serve as his cover.

Moving With the Pistol

The likelihood of encountering a threat dictates how the pistol is carried while the Marine is moving. But regardless of the method of carry, the pistol's muzzle is pointed in the same direction that the head and eyes are looking—the eyes and muzzle move as one.

When carrying the pistol in the Alert position, the pistol is tucked in close to the body, finger off the trigger. This position allows the Marine freedom of movement and still allows for a quick presentation of the pistol.

If there is a high probability of encountering a threat, the Marine carries the pistol in the Ready position while moving.

Moving: The Glide Technique

To shoot accurately while moving, the Marine cannot run or walk fast. A normal running movement produces too much bounce in the Marine's body and makes it extremely difficult to use the sights of the pistol or to achieve the needed level of stability for accurate shooting. Therefore, the proper movement technique is similar to a glide and allows for accurate target engagement:

- A lower center of gravity is achieved by keeping the knees bent and the upper body erect.
- The bent knees also serve to absorb the shock generated by movement.
- The feet are not lifted as high as in a normal walk or run, allowing obstructions to be kicked out of the way.
- The feet and knees point in the direction of travel. If there is a need to engage a target off to the side, the Marine rotates at the waist to move the upper body in the desired direction. The upper body shooting position does not change.

The glide is not a technique that can be used for a long period of time or for long distances. Rather, the Marine can move in a normal manner until it becomes necessary to engage a target, he then slows and assumes the glide.

Engaging Targets: Using the Pistol Sights

When the Marine fires the pistol, he must concentrate on the pistol's front sight. The adherence to the fundamentals of marksmanship becomes even more vital when both the Marine and the enemy may be moving.

Continuing to Move

A Marine continues to move no matter what happens. Continuing to move makes it difficult for the threat to engage the Marine and can be one of the Marine's best defensive assets. When moving to cover or to a different position, the Marine should not stop to engage a target.

Reloading and Stoppages

If a stoppage occurs or a reload is required while moving, the Marine's primary consideration is to keep moving and seek cover. Ideally, reloads and clearing stoppages are performed behind cover.

Turn and Fire

The techniques for turn and fire allow a Marine to engage a target that is not directly in front of him. The key to turn and fire is smoothness and quickness of pivoting and presentation of the pistol to engage the threat. Turn and fire is based on the principle that wherever the head goes, the body follows.

Engaging Targets 90 Degrees to the Right and Left

The Marine turns the head toward the threat and identifies the target. Once the target is identified, the Marine maintains focus on the target for the rest of the presentation.

If engaging a target 90 degrees to the right, the Marine turns toward the target by raising the left foot while pivoting on the ball of the right foot. The Marine plants the left foot once he is facing the target squarely. The stance is natural. See figure 9-1. The Marine then engages the target.

Figure 9-1. Engaging Targets 90 Degrees to the Right.

If engaging a target 90 degrees to the left, the Marine turns toward the target by raising the right foot while pivoting on the ball of the left foot. The Marine plants the right foot once he is facing the target squarely. The stance is natural. See figure 9-2. The Marine then engages the target.

Engaging Targets 180 Degrees to the Rear

The Marine turns the head toward the target, looking over either the right or left shoulder, and identifies the target. Once the target is identified, the Marine maintains focus on the target for the rest of the presentation. See figures 9-3 on page 9-4.

If the Marine pivots to the right to engage the target, pick up the left foot, move it across the right foot, while pivoting 180 degrees on the ball of the right foot, plant the left foot, and squarely face the target in a natural stance. See figure 9-4 on page 9-4.

If the Marine pivots to the left to engage the target, pick up the right foot, move it across the left foot, while pivoting 180 degrees on the ball of the left foot, plant the left foot, and squarely face the target in a natural shooting stance. See figure 9-5 on page 9-4.

The Marine then engages the target.

Figure 9-2. Engaging Targets 90 Degrees to the Left.

Figure 9-3. Engaging Targets 180 Degrees to the Rear.

Figure 9-4. Engaging Targets 180 Degrees to the Rear (Right Shoulder).

Figure 9-5. Engaging Targets 180 Degrees to the Rear (Left Shoulder).

CHAPTER 10
LOW LIGHT AND DARKNESS TECHNIQUES

An effective combat marksman must be prepared to detect and engage targets under a variety of conditions. Factors such as terrain and opportunity often dictate that the Marine engage combat targets at night or under low-light conditions.

The fundamentals of marksmanship are employed for engagement of targets in low light and darkness just as they are in daylight. However, the principles of night vision and target detection when engaging targets at night must be applied.

Combat Mindset

In the stress of the combat environment, Marines must eliminate any hesitation, fear, or uncertainty of action and focus on the actions to fire well-aimed shots. This is important during low light and darkness when attention is more easily diverted because the sense of vision is reduced. This may create a shock of awareness as the Marine relies more heavily on his other senses. Every noise, movement, and muzzle blast appears intensified at night. The physical acts of shooting must become second nature to the Marine, so his focus will not be diverted from firing well-aimed shots. This is accomplished through mental preparedness and training until shooting actions become instinctive.

Night Vision Adaptation and Maintenance

Night Vision Adaptation

There are two methods for acquiring night vision.

The first method is to remain in an area of darkness for about 30 minutes. This area can be indoors or outdoors. The major disadvantage of this approach is that a Marine is not able to perform any tasks while acquiring night vision in total darkness.

The second method is to remain in a darkened area under a low intensity red light (similar to the light in a photographer's darkroom) for about 20 minutes, followed by about 10 minutes in darkness without the red light. This method produces almost complete night vision adaptation while permitting the performance of some tasks during the adjustment period.

Night Vision Maintenance

Because the eyes take a long time to adjust to darkness, it is important to protect night vision once it is acquired. To maintain night vision, the Marine avoids looking at any bright light and shields the eyes from parachute flares, spotlights, or headlights. When using a flashlight to read a map or other material—

- Put one hand over the glass to limit the area illuminated and the intensity of the light.
- Keep one eye shut to reduce the amount of night vision lost.
- Cover the light with a red filter to help reduce the loss of night vision.

Target Detection Techniques

Once the Marine has acquired night vision, he is prepared to locate targets. Some of the daylight observation techniques, such as searching for target indicators, also apply at night or in low light. But night observation techniques must allow for the limitations of night vision and the need to protect it.

Off-Center Vision

Because of the placement of the cones in the center of the retina and the rods around the edges, the angle at which the Marine observes an object at night affects how well it is seen. Off-center vision is the technique of keeping the attention focused on an object without looking directly at it. To maximize the use of the eye's rods that provide night vision—

- Never look directly at the object being observed.
- Look slightly to the left, right, above, or below the object.

Each Marine must experiment and practice this technique to find the best off-center angle. Typically, the best off-center angle is 6 to 10 degrees away from the object or about a fist's width at arm's length. See figure 10-1.

Scanning/Figure Eight Scan

Scanning is the use of off-center vision to observe an area or object and involves slowly moving the eyes in a series of separate movements across the objective area. See figure 10-2. To execute a figure eight scan, move the eyes in a figure eight pattern in short, abrupt, irregular movements over and around the area. Once a target indicator has been detected, focus should be concentrated in that area, but not directly at it. It is more effective to scan from a prone position or a position closer to the ground than the object being observed, creating a silhouetted view of the object. When scanning an area, look and listen for the same target indicators as in daylight: movement, sound (which seems louder at night than during daylight), and improper camouflage. Also, objects in bright moonlight/starlight cast shadows just as in sunlight.

Effects of Illumination

Both ambient (natural) light and artificial illumination can affect a Marine's perception of the target's distance and size and his night vision. The following situations produce less of an effect at the close ranges that pistol engagements occur, but they still affect target detection and engagement:

- Light behind or between the Marine and the target illuminates the front of the target and makes it appear closer than it actually is.
- Light beyond the target displays the target in silhouette and makes it appear farther away than it actually is.
- The introduction of light requires the eyes to make a sudden, drastic adjustment to the amount of light received, causing a temporary blinding effect that occurs when night vision is interrupted abruptly. Ambient light can also have the

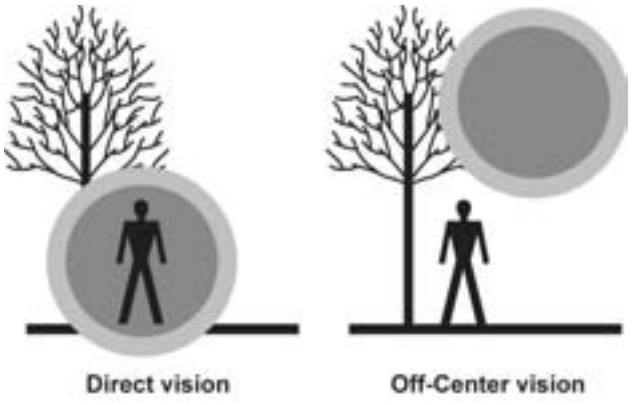


Figure 10-1. Off-Center Vision.

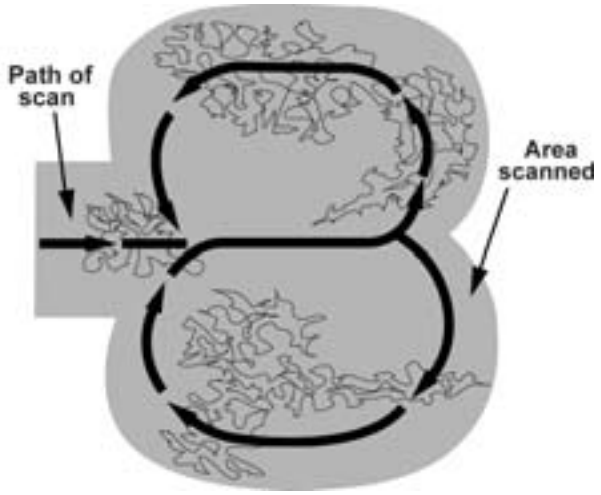


Figure 10-2. Figure Eight Scan.

same blinding effect; e.g., when a bright moon suddenly appears from behind clouds.

Acquiring Targets at Night

The Marine must keep both eyes open to get maximum visual coverage of the target area. Keeping both eyes open also improves depth perception and peripheral vision.

Sight Alignment/Sight Picture

Sight alignment and sight picture are obtained the same way in darkness as in daylight. There is normally enough ambient light to perceive objects as far away as 50 meters, especially if they are moving. However, when pistol sights are placed on a dark background, such as a camouflaged target, the Marine may not be able to acquire and align the sights clearly. Instead, the Marine may have to rely almost entirely on his presentation, firing position, and grip to get the pistol on target. To check for sight alignment or acquire the sights:

- Move the pistol just off the edge of the target to an area that provides a good contrast.
- Acquire sight alignment.
- Bring the sights back on line with the target while applying pressure to the trigger so the shot breaks once the sights are on target.

Flashlights

A flashlight can be used in low light and darkness to identify and illuminate targets. It is also used to acquire sight picture.

Types of Flashlights

There are a variety of flashlights used throughout the Marine Corps. They come in many different shapes and sizes; however, they are either straight/tubular or L-shaped.

Straight/Tubular

The straight/tubular flashlight is the most common. The body of the flashlight is a straight/tubular shape with the lens at the head of the flashlight. The on/off mechanism is located along the body or at the base of the flashlight.

L-Shaped

The L-shaped flashlight has a straight/tubular body, with the head/lens of the flashlight positioned at a 90-degree angle to the body of the flashlight. The on/off mechanism is located along the body or at the base of the flashlight.

Activation Devices

Depending on the type of flashlight, there are several ways that it can be activated.

On/Off Button

On/off buttons are located either along the body of the flashlight or at the base. On/off buttons are operated in a number of ways, depending on the flashlight.

On/Off Switch

On/off switches are mounted on the body of the flashlight. This switch has three settings that allow the flashlight to be either on, off, or in manual mode. In the manual mode, the flashlight is turned on by pressing and holding the button located next to the on/off switch.

Rotating Head

Rotating the head of the flashlight, either clockwise or counterclockwise, turns the flashlight on. Continuing this motion allows the width and intensity of the beam to be adjusted.

Types of Lenses

Clear Lenses

Clear lenses are used primarily for target detection and to illuminate the pistol sights. They are the most commonly used lens.

Colored Lenses

Colored lenses include red, amber, and blue. These lenses are used primarily for map reading and signaling, but can be used to illuminate the pistol's sights.

Target Detection

When a target is illuminated, the front sight may become silhouetted against the target, providing the sight picture needed to engage the target. During target detection, the Marine's focus should be twofold: to scan the area to identify possible targets and to assess the area to formulate a plan for engagement or cover (e.g., identifying the quickest route to cover, determining the best method for engagement based on terrain).

Searches

The Marine executes a hasty search immediately upon entering a new area in order to identify a threat that poses immediate danger. To execute a hasty search—

- Quickly scan the area with the flashlight taking note of obvious points throughout the area that could cover or conceal the enemy. Wherever the eyes move, the flashlight should move.
- Aim the flashlight beam on the ground about 8 to 10 feet in front of the Marine's location, this allows the eyes to follow the beam and quickly establishes a reference point for the light. Aiming the beam at the outer edge of the search area strains the eyes to find the beam and decreases the field of view.

The Marine executes a detailed search after the hasty search. A detailed search focuses on target indicators identified during the hasty search. To conduct the detailed search—

- Focus the most direct or intense portion of the flashlight beam on the target indicators.
- Move the beam of light slowly across the target indicator from right to left or left to right. Wherever the eyes move, the flashlight should move.

Considerations

During night operations, the Marine should use a flashlight whenever possible. A flashlight not only helps the Marine locate targets at night, but the beam can be aimed directly at the target once it is detected and temporarily blinds the target. This gives the Marine the advantage to react before the target does. However, the Marine must consider the following:

- Anytime a flashlight is on, the location may be revealed to the enemy. The Marine should keep the flashlight pointed out in front of his body to help avoid illuminating himself and revealing his position.
- Light shined directly from in front of the Marine at the target obscures the Marine.
- Light shined from the side of the Marine at the target illuminates the Marine.
- Light can bounce off surfaces and reflect back onto larger areas that the light is not focused on. Therefore, whenever a Marine shines a flashlight onto a surface, some of the light may reflect back and illuminate the Marine.
- When positioned at the outside corner of a room, building, or other cover, the Marine should avoid pointing the flashlight beam directly at the corner because the beam reflects off the corner and illuminates the Marine. To prevent this, the head of the flashlight should extend just beyond the corner.
- Many flashlights have adjustable beams that aid in target detection. The beam's intensity must be adjusted to provide the best illumination of the area depending on the distance between the Marine and the area of observation.
- Diffused light from a wide beam creates a softer light and illuminates a greater area, but the beam does not travel a great distance. A wide beam is best for observing larger areas at close range.
- Concentrated light from a narrow beam illuminates a smaller field of view, but the beam travels a greater distance. A concentrated beam is effective for observing a specific area or an area that is further away. Concentrated light

blinds the enemy and prevents him from focusing on the Marine or determining his location.
- When searching an area, the Marine can alter the position where he is holding his flashlight so that the beam is perceived as coming from various locations. For example, the Marine can turn the flashlight on from a standing position, quickly search for targets, turn the flashlight off, assume a kneeling position, and search again. This keeps the enemy from obtaining an exact location of the Marine's position.
- Keep both eyes open to get maximum visual coverage of the target area. Keeping both eyes open also improves depth perception and peripheral vision.

Target Engagement

Once a target is detected using a flashlight, the flashlight can be used to acquire sight picture and facilitate engagement of the target. The fundamentals of marksmanship are employed for engagement of targets in darkness just as they are in daylight. However, the Marine must apply the principles of night vision and target detection and must be able to employ a flashlight properly when engaging targets at night.

Grip

To engage a target accurately while using a flashlight, the flashlight must be held to maintain the pistol's stability, control, and recoil during firing. Normally, the left hand (two-handed grip) provides the pistol's stability and ability to manage recoil. However, when firing with a flashlight, the left hand holds and operates the flashlight. Therefore, some stability, control, and management of recoil is lost.

Securing the Flashlight

Most flashlights come equipped with a retaining loop located at the base for ease of transportation. To position the cord properly:

- Feed one end of the cord through the retaining loop of the flashlight and tie the ends of the cord together.
- Slip the left hand through the cord loop. The loop should be just big enough so that, if the flashlight needs to be dropped, it can be retained on the wrist.
- Rotate the flashlight until the cord is twisted to the desired tension and length necessary to best stabilize the rear end of the flashlight in the hand.
- Grasp the flashlight with the left hand in a position that allows it to be operated easily.

If the flashlight has a retaining loop, attaching a cord to the loop helps support and stabilize the flashlight when the Marine must fire the pistol with the flashlight in his left hand. The cord also helps retain the flashlight.

Acquiring Sight Alignment/Sight Picture

When holding a flashlight on a target, the tendency is to look at the target rather than the sights. Sight alignment is still necessary for effective target engagement. Using a flashlight to illuminate a target allows the Marine to—

- Acquire sight picture by silhouetting the sights against the target.
  - The Marine establishes sight picture by focusing the sights in the soft, diffused light area of the target.
  - At close ranges, colored lenses produce enough light on the target to silhouette the sights; at long ranges, colored lenses will not provide enough light off the target to illuminate the pistol sights. The Marine must be able to see the target by some other means, (e.g., contrast, moonlight).
- Acquire sight picture by illuminating the sights.
  - A colored lens can be held directly over the sights to shine light on the top of the pistol to illuminate the sights. This allows sight alignment to be established without revealing the Marine to the enemy. This method can also be used with a clear lens to make a precision shot at long ranges but the Marine risks being illuminated by the light.
  - A colored lens can be shined from directly behind the pistol sights to illuminate them. This

allows sight alignment to be established, but reveals the Marine's position to the enemy.

Target Engagement Techniques

Two-Handed Grip Technique. This technique is typically used with a straight/tubular flashlight. The pistol and flashlight must be side by side and level so the Marine can engage a target without making adjustments to the pistol or the flashlight. This technique is also effective for firing multiple shots because the flashlight and pistol recoil as a unit.

Whenever possible, the flashlight is just in front of the muzzle of the pistol so that it does not illuminate the pistol. Placement of the flashlight alongside the pistol may need to be adjusted depending on the size of the flashlight or the location of the on/off mechanism.

This technique is most often used with an Isosceles position (see fig. 10-3):

- Grasp the flashlight with the left hand, lens pointing down range.
- Wrap the thumb and index finger of the left hand around the body of the flashlight, thumb resting on the on/off switch to allow easy operation of the on/off switch without disrupting the grip on the flashlight.
- Extend both arms toward the target and bring the flashlight alongside the pistol so the fingers of the left and right hands touch.
- Wrap the bottom three fingers of the left hand around the fingers of the right hand, incorporating the flashlight into a two-handed grip.
- Apply isometric pressure against both hands to aid in stabilizing the pistol.

This technique can also be incorporated into a Weaver position; the more the left hand wraps around the right, the more the body can be angled and the left elbow bent. Apply push-pull pressure on the grip to stabilize the pistol. See figure 10-4.

Cross-Hand Technique. The cross-hand technique is used primarily with a Weaver position and can

Figure 10-3. Two-Handed Grip Technique With Flashlight (Side and Front View).

be used with either a straight/tubular flashlight or an L-shaped flashlight (see fig. 10-5):

- Grasp the flashlight with the left hand, fingers wrapped around the top of the flashlight and thumb wrapped around the bottom.

Figure 10-4. Two-Handed Grip Technique With Flashlight (Weaver Position).

Figure 10-5. Flashlight Cross-Hand Technique.

- Place the thumb on the on/off button while maintaining a firm grip on the flashlight.
- Extend both arms toward the target and bring the left hand under the pistol so that the back of the left hand is resting firmly against the back of the right hand.
- Apply isometric pressure against both hands to aid in stabilizing the pistol.
- Extended the right arm fully and bend the left arm at the elbow.

Considerations for the Carry/Transport

When searching an area for targets, the Marine moves with the pistol at the carry or transport dictated by the threat level.

The Ready. If enemy contact is expected (contact imminent), the Marine carries the pistol at the Ready and carries the flashlight in his left hand and incorporates it into his firing grip. In the Ready, the Marine can search for targets and readily present the pistol and flashlight to the target for engagement without making adjustments to either the grip or the flashlight. See figure 10-6 on page 10-8.

The Alert. If enemy contact is likely, the Marine carries the pistol at the Alert and the flashlight in his left hand and incorporates it into his firing grip. The Marine must ensure the flashlight is not pointed at the deck because it illuminates the Marine. If necessary, the head of the flashlight may have to be tilted up to elevate the beam to increase the field of view. If the flashlight has been tilted, it has to be lowered so it is level with the pistol muzzle and the light shines directly on the target in order to establish sight picture. See figure 10-7 on page 10-8.

Holster Transport. If there is no immediate threat, the pistol is holstered and the Marine carries the flashlight with his left hand to search for targets. Should a target present itself, the Marine presents the pistol from the holster and engages the target. Time and distance to the target dictate whether the Marine incorporates the flashlight and his left hand into the firing grip.

Figure 10-6. Flashlight Ready Carry (Cross-Hand and Two-Hand Grip).

Figure 10-7. Flashlight Alert Carry (Two-Handed Grip and Cross-Hand).

U.S. Army Marksmanship Unit

Pistol Marksmanship Training Guide

Here is the coveted Pistol Marksmanship Training Guide published by the Army Marksmanship Unit at Fort Benning, Georgia. It is an excellent source of information for the competitive pistol shooter. Because it is a U.S. government publication, it is public domain. I encourage you to explore this entire manual!

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INTRODUCTION

The fundamentals of pistol marksmanship embrace all of those physical factors essential to the firing of an accurate shot. Accuracy, in this sense, assumes that the weapon is zeroed, that a high degree of inherent accuracy exists in both the weapon and the ammunition, and that the firing is taking place under ideal conditions.

Essentially, accurate shooting with a pistol requires no elements other than those described in the following sentence: **ALIGN THE SIGHTS PROPERLY ON THAT PART OF THE TARGET REQUIRED FOR YOUR GROUP TO CENTER IN THE TARGET AREA AND CAUSE THE HAMMER TO FALL WITHOUT DISTURBING THAT ALIGNMENT**. All elements of pistol shooting such as position, grip, sight alignment, breath control, trigger control, physical condition, and psychology of shooting, when perfected, simply enables the shooter to perform the action described in the above key sentence.

In order for a shot to be accurate, it is first necessary to make sure that the pistol will be held as motionless as it is possible to do so during the time that the shot is being fired. The stance assumed by the shooter must provide the greatest stability possible for both the shooter's body and the weapon.

To obtain a minimum arc of movement the shooter must give the pistol a definite stability of direction. Proper body position points the pistol directly toward the target with no tendency to drift or move to either side. Likewise, the vertical movement of the pistol is confined to the aiming area. Breathing is accompanied by the rhythmic movement of the chest, and in order to keep the pistol as immobile as possible the shooter must hold his breath for the length of time required to deliver an accurate shot. To obtain correct sight alignment, it is necessary for the shooter to grip the pistol in a manner which guarantees that he is holding the pistol firmly and that trigger pressure is applied straight to the rear. The delicate balance of sight alignment and minimum arc of movement can be easily disturbed if the trigger is activated in a manner which causes excess movement. However, since the shooter cannot achieve complete immobility when assuming the stance and position, the trigger has to be pressed during some movement of the pistol. In order to deliver an accurate shot within his ability to hold, the shooter must not only press the trigger evenly, but he must to so with correct sight alignment. The size of the shot group will, therefore, not exceed the dimensions of the arc of movement, provided the shot breaks as a surprise and no reflex action of muscles disturbs the delivery of the shot.

To help the shooter acquire the necessary knowledge to master all the factors that control his shooting we shall analyze In detail each separate element of accurate shooting - stance, position, grip, holding the breath, sight alignment, and control of the trigger. Also included will be certain methods of training that will accelerate the shooter's development into a champion pistol shot. This status is achieved only after the shooter has mastered the technique of executing the fundamentals.

Chapter I

Attaining a Minimum Arc of Movement

It is necessary during firing to press the trigger under varying conditions of pistol movement in conjunction with correct sight alignment. In order to apply coordinated pressure on the trigger, the shooter must wait for those very definite times when all control factors are optimum and firing conditions become favorable. The rule that must be observed as the first step in attaining control of your shooting is: "You must never attempt to fire until you have completely settled into a minimum arc of movement. "

In order to learn how to fire a shot at the proper time, the shooter must make analysis of the time needed to settle and the duration of the minimum arc of movement.

The entire system, consisting of the shooter's body and the pistol, always undergoes a degree of movement. This is sometimes a pulsating, swaying or erratic arc of movement during aiming and firing a shot. The cause of this movement aside from conditions such as weather, is the action of the muscles maintaining the shooter's body in a definite position. Other action such as blood pulsation, causes movement of individual parts of the shooter's body and the pistol. The nature and extent of the arc of movement changes within the time being devoted to delivering a shot. For example, when the shooter is first getting his sight alignment and has not yet had time to settle his body and pistol, the extent of the movement is relatively great. As the body becomes balanced and the aiming is more precise, the arc of movement minimizes. After a certain length of time, the minimum arc of movement begins to increase, because the muscles begin to fatigue, and the shooter does not have enough air in his lungs to continue holding his breath. If we record the arc of movement, we will see a wavelike line with varying amplitude of oscillation (Figure 1-1).

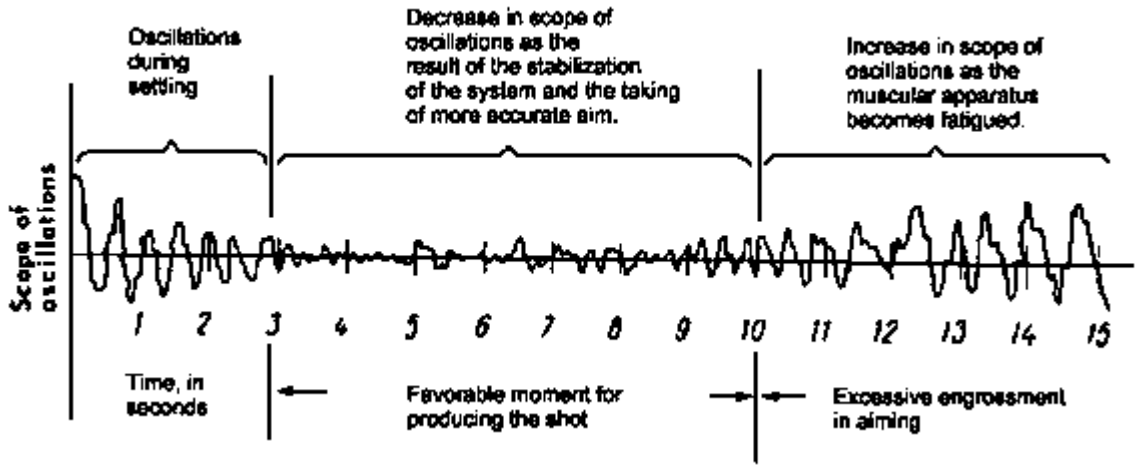

Oscillations during settling
Decrease in scope of oscillations as the result of the stabilization of the system and the taking of more accurate aim.
Increase in scope of oscillations as the muscular apparatus becomes fatigued.
Scope of oscillations
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time, in seconds
Favorable moment for producing the shot
Excessive engrossment in aiming

Figure 1-1. Basic Scheme of Minimum Arc of Movement.

It is obvious that under such circumstances the shooter must begin his smooth pressure on the trigger while not devoting too much attention to the arc of movement as long as it remains at the minimum. Continue to apply pressure on the trigger and intensely concentrate on keeping the sights in alignment. The resulting five to seven second period is the most favorable time for firing an accurate shot.

Taking into consideration the direct relationship between accuracy of shooting and the degree of immobility of the pistol when the shot is being delivered, the marksman must give greatest consideration to the selection of a stance, a position, a grip, and a means of breath control which will guarantee the greatest stability to both the pistol and the body. The relatively small degree of movement thus obtained

provides a stable foundation, permitting use of the other fundamentals.

A. THE STANCE.

The excellence of the stance is a major factor in creating conditions for maximum control. A high degree of control is necessary for the delivery of an accurate shot. Every individual possesses a combination of individual characteristics that are peculiar to him alone. Among these are height, weight, proportion of body, development of muscle system, etc. It follows, then, that there cannot be any definite, all-purpose stance which applies equally to all shooters. Therefore, the shooter himself, on the basis of his own particular configurations, must find the variation of stance which provides the greatest degree of stability for his body.

1. The Main Requirements of the Stance: The assumed stance is the position of the human body to support a pistol aimed at a target. Despite the great number of physical differences encountered in any cross-section of shooters, the stance must provide for:

    a. The greatest possible degree of equilibrium and stability in the body-weapon system with the least possible strain on the shooter's muscles.

    b. A head position which will allow for the most efficient use of the shooter's eyes throughout the sighting and aiming process.

    Throughout the process of training it is necessary, therefore, for the shooter to exercise special care in the selection of a stance. The development of a poor stance should be detected and corrected early in the training program. Otherwise, it may require the breaking of deeply ingrained habits later.

    Considering the role played by the muscles, bones and ligaments in the creation of stability in the shooter's stance, it is necessary for the shooter to understand the makeup of the human body. See Section Five, Annex I for supplemental information entitled, "Characteristics of the Human Body Relevant to Stance, Position and Grip ".

2. Assuming the stance:

    a. When assuming the firing stance, the head must be held as level as possible, so that the shooter can see the target directly in line with the arm and sights. It is necessary to take all steps to eliminate the tilting of the head to the right or left or an excessive tilting forward. It is not necessary to look sideways or to look at the sights from beneath the eyebrows. The head should not be pushed forward closer to the rear sight; neither should the head be tilted back excessively. This causes undue tension upon the neck muscles and, as a consequence, a slight movement of the head develops from fatigue. This may hinder the maintenance of perfect sight alignment.

    b. When assuming a firing stance, the shooter must support the extended arm holding a weapon. As a result, the muscular system undergoes considerable strain. It must not only maintain the shooter's body in a definite position but must also exert a counteraction to the rather large weight of the suspended gun.

    c. A shooter supporting a weapon constitutes a single system with a common center of gravity (Figure 1-2). Since the entire system is in equilibrium only when its line of gravity runs through the support area, (Figure 1-3), the holding of the weapon causes a change in the relative position of the individual parts of the body. A compensating displacement is brought about by the necessity to create a counteraction to the weight of the pistol and supporting arm. This compensating displacement of the parts of the body changes the shooter's posture. As a result, when he assumes a firing stance, his body takes on an asymmetric position which is unnatural. The preservation of the body's equilibrium in this unnatural posture requires that a greater load be placed upon the muscles and ligaments reinforcing the movable portions of the body.

    d. The shooter has the task of finding for himself a suitable stance which will achieve immobility of the body without an excessive strain on muscles.

    Let us assume that the shooter takes a stance for firing that will preserve the natural, erect posture of the body. He will strive to keep it erect with small compensating deviations of the muscle system. Thus, the extended arm holding a pistol places great tension on the muscles in the back and shoulders. In addition, if the shooter's figure is examined from the side, it will

become obvious that when the shooter's body is kept stiffly erect, the body will be slightly unstable. The keeping of the body rigid will result in early fatigue and cause undesirable movement.

e. What posture should be given to the body in order to best support the weapon with the least expenditure of muscular effort?

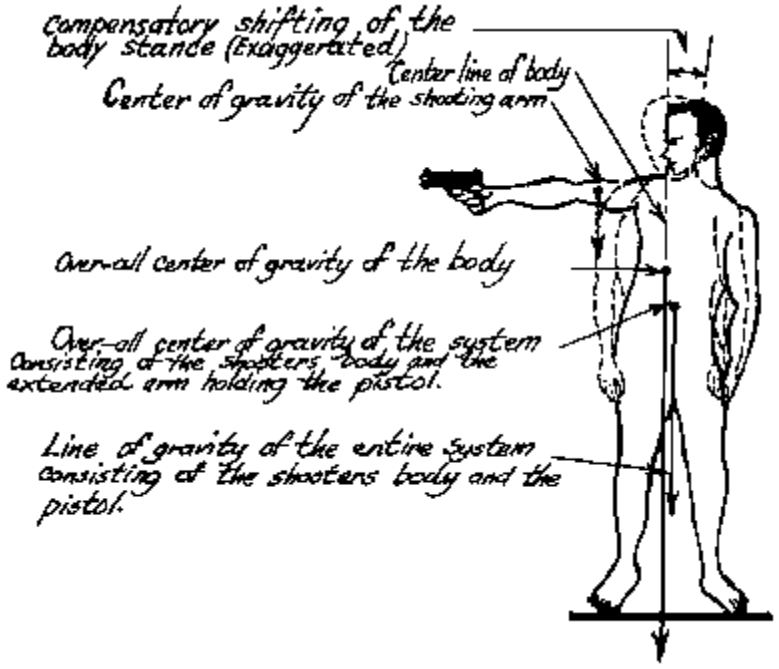

Compensatory shifting of the body stance (Exaggerated)
Center line of body
Center of gravity of the shooting arm
Over-all center of gravity of the body
Over-all center of gravity of the system consisting of the shooters body and the extended arm holding the pistol.
Line of gravity of the entire system consisting of the shooters body and the pistol.

Figure 1-2. Situation of the Over-all Center of Gravity of the Entire System

The shooter must hold his body in something less than an erect posture, with a slight rearward bend in the back and the pelvis brought slightly forward. In this posture, the body has the vertical line of the center of gravity shifted back of the axis of the hip joints. In such a pose, the body is kept stable in the hip joints not so much by the work of the muscles, but by strong ligaments. The relaxed immobility of the body is attained by counterbalancing the weight of the upper body against the extended firing arm and pistol, and transfer much of the weight to the spinal column.

f. The selection of the most stable stance will include giving the body a certain degree of bend. As shown by practice, the shooter has nothing to fear in giving his body an asymmetric pose.

g. The stability of the firing arm and weapon depends to an extent upon the correct placement of the feet. This determines the support area for the shooter's body. The most stable and most comfortable stance will be when the feet create a support area in the shape of a trapezoid with the feet placed apart, approximately shoulder width. The toes should be spread apart slightly (Figure 1-3). This placement of the feet creates not only a comparatively large support area, but is also the most favorable positioning of the feet for avoiding muscular strain in the legs.

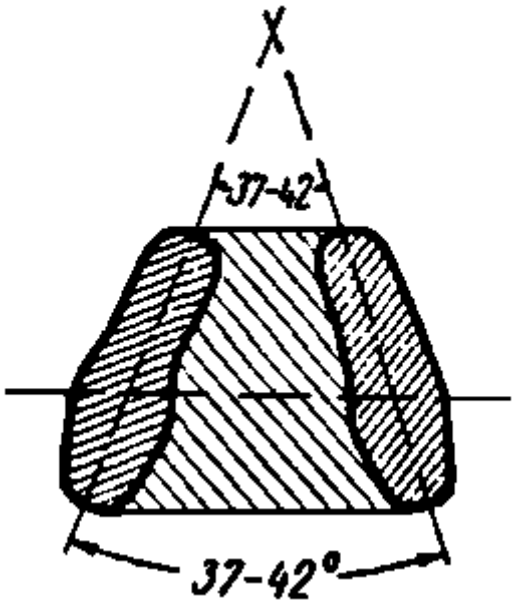


Figure 1-3. Placement of the Body's Support Surfaces - Both Feet - in Relation to One Another, Creating the Support Area for Firing.

h. When assuming the firing stance, the shooter should not attempt to bring the legs too close to one another. Narrow placement of the legs decreases the support area and will result in a lose of stability, causing movement of the firing arm along the horizontal. Do not place the legs too far apart, as this creates undesirable strain on the inner arches of the feet, straining the leg muscles and holding the hip joints rigid, which leads to fatigue and an increase in the arc of movement.

i. In order for the stance to be a stable one, the shooter must, first, distribute the weight of his body, the arm and pistol evenly on both legs; second, the load placed on each leg must pass through the middle of the foot or close to the balls of the feet. When the weight of the body is distributed in this way the body's line of gravity will run through the middle of the support area. The stance will be the most stable when the muscles of both legs carry the same load. The coordinated work of these leg muscles results in the body's weight being alternately shifted in slight corrective moves in order to maintain balance.

j. The degree of strain upon the muscles and ligaments of the knee joints is of importance in the stability of the stance. The insufficiently rigid position of the knee joints will lead to an increase in the body's movement as a whole. By holding one leg straight and keeping the other one partially bent, varying tensions will exert excessive tension on the leg muscles. Inflexible straightening of the legs also causes tension of the leg muscles which leads to a loss of stability.

k. The group of muscles which do not directly participate in maintaining the shooter's body in the vertical position or holding the pistol aimed at the target is the muscles of the left arm and hand, the left-hand portion of the chest, the neck muscles, the abdomen, and the buttocks, must be relaxed as much as possible.

   It is necessary to properly position the left or free arm and hand (for right-handed shooter). The free hand should be inserted into the left aide pocket in a relaxed manner, or you may hook the left thumb over the waist belt. In relaxation of the left arm and shoulder, the free arm must not be allowed to hang loose, as any wind or recoiling of the body during firing will cause the free arm to swing, transferring to the body any movement.

l. The pistol arm should be extended with the wrist stiff and the elbow locked without strain. The arm must be straight, firmly extended and with no unnecessary tension of the muscles. This establishes solid arm control.

m. The body weight center of gravity should be brought forward slightly from the center of the support area, with a very slight shift toward the tips of the foot to reduce the action of the balance correcting mechanism. This is apparent in the alternate tensing and relaxing of the muscles of the legs, abdomen and lower back. This action to regain equilibrium is continuous. The body cannot

remain motionless because the equilibrium does not remain constant. The constant corrective process causes an almost imperceptible weaving or sway.

3. The stance factor is so essential that a step-by-step summary of all of the points important to a proper stance is in order.

   a. Stance must provide for:

      (1) The greatest possible degree of equilibrium and stability of the shooter's body and weapon with the least possible strain on the shooter's muscular system, and the smallest movement possible of any part of the body, the shooting arm and the pistol.

      (2) A head position which will allow for the most favorable conditions for the operation of the eyes during aiming.

   b. During training, the shooter must take special care that he is not developing an incorrect stance or body posture which will require a breaking of habits later.

   c. The shooter should become familiar with assuming the proper stance and practice getting the same stance each time it is assumed. The requirements are:

      (1) The feet are separated about the width of the shoulders or slightly less, toes pointed out slightly.

      (2) Stand up erect and relaxed.

      (3) The legs should be straight, but not stiff, knees firmly straight but not rigidly locked.

      (4) The hips should be level and in a natural position.

      (5) The abdomen should be relaxed.

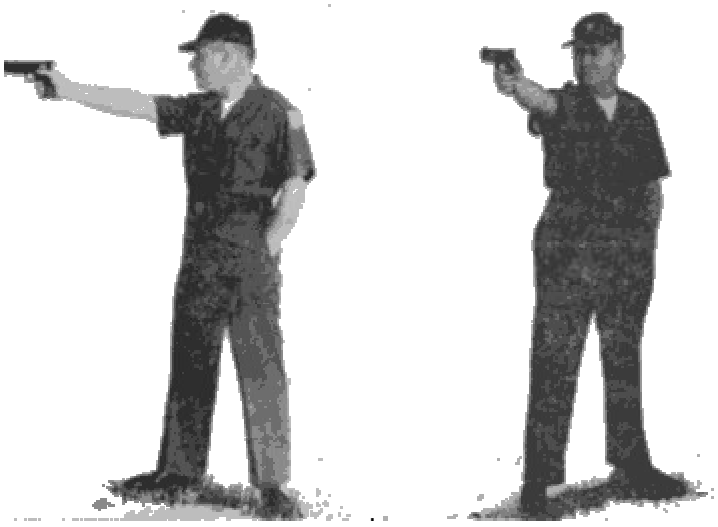


Figure 1-4. Two Views of an Effective Stance.

      (6) The shoulders and head should be level. No humping over or slouching with an unnatural tilt to the head.

      (7) The non-shooting arm should be relaxed, the free hand in the side pocket or thumb hooked over the belt, not hanging loose.

      (8) The pistol arm should be extended with the wrist stiff and the elbow locked without strain.

      (9) The body weight center of gravity should be brought forward slightly from the center of the support area, with a very slight shift toward the tips of the feet to reduce the action of the balance correcting mechanism.

B. POSITION.

When preparing for accurate shooting, it is insufficient merely to assume a comfortable and stable stance. You must be able to aim or point at your target in a natural, consistent manner. Improper position will affect your ability to establish or maintain the hold in the center of the aiming area. Before each shot or string of shots, it is necessary to check the correctness of the assumed position with respect to the target. Avoid unnecessary muscular tension in the effort to hold in the aiming area. An adverse effect upon the movement of the shooting arm and weapon is caused by extra muscular effort.

Match competition requires the shooter to fire a large number of shots in one day. It is necessary to find the most effective position, which will allow the shooter's body to assume an identical position over a long period of time without causing undue strain upon the muscular system. Any feeling of discomfort, fatigue, constraint or a continuing necessity to correct the orientation of the body to the target distracts the shooter's attention from the principal goal; the uniform, absolute control of an accurate shot. The finding of the most effective position when firing will provide for a consistent pointing of the shooting arm and weapon and provide a free and unforced feeling of natural alignment with the target during the entire period of shooting.

1. The shooter must position himself so as to naturally align or point himself and his weapon with the target so the hold will remain in the desired area without a tendency of the shooting arm to drift away from the aiming area.

2. To orient or align yourself properly with the target, use the following method:

    a. First face approximately 40 to 50 degrees from the target using the methods of assuming the stance previously mentioned.

    b. Look at the target by turning only the head. Keep the head level and turn it far enough toward the target to allow the eyes to look straight out of the head.

    c. Raise the arm to align with the target. Close your eyes, raise your pistol arm a foot or two above the horizontal and then allow it to settle back relaxed and naturally to the horizontal. Completely relax the arm and shoulder not being used. Repeat this procedure once or twice and settle into a natural point. A true, natural point is not obtained with the eyes open.

    d. After settling into a natural point, open your eyes to check if your arm and pistol are aligned with the target. If the pistol has settled in the center of the target, you have your natural position.

    e. If the arm settles to one side of the target center, move your rear foot in the direction of error. Maintain without change the stance of the body as a unit from the feet to the shoulders and head. Swing the whole body by shifting the position of the feet until the arm and pistol are naturally aligned on the center of the target. Tests such as this will readily indicate your natural position. In no instance must the shooter correct errors in hold by moving the arm independent of the body. This type of correction is purely artificial and the arm will revert to the original error after recovery from the recoil of a shot.

    f. Recheck after each error is found until no error exists.

3. The shooter must always remember that the improvement of his marksmanship skill requires an unceasing search for an even better stance and position. The position and stance assumed must not be considered as something constant. As marksmanship skill develops, changes in the stance and position are necessary in order to improve performance.

4. Many expert marksmen, as a result of long and persistent training have completely developed their stance and position to the point of automation, sometimes not even noting its individual shortcomings. It sometimes happens that some experts, even though they know about their shortcomings, do not attach the proper importance to them. Only when the individual shortcomings in position or stance become a serious hindrance to their progress do they begin to change. The overwhelming majority of the leading shooters actually work seriously and creatively to improve themselves by evaluation of their position and stance.

5. Young shooters must not blindly copy, and instructors and coaches must not mechanically,

without any analysis, instill in their pupils a particular variation of position or stance. It is necessary to make an intelligent approach to the problem of selecting the particular stance and position that is acceptable to oneself, taking from the experts desirable aspects and rejecting undesirable ones.

Figure 1-5. Getting the Grip.

Figure 1-6. The Grip.

C. GRIP.

The proper grip is one which provides the shooter with the maximum control of the weapon. To maintain a natural sight alignment, he must hold the weapon firmly and be able to apply positive, straight to the rear pressure on the trigger that will not disturb sight alignment.

1. Uniformity: For maximum control, all of the requirements for a proper grip must be uniformly applied at all times.

2. Requirements: The proper grip on a pistol is one that meets the following requirements:

    a. The grip should be such that the front and rear sights will stay in natural alignment without any extra effort to maintain the relationship. Without this feature, there will be a tendency for the front sight to move over to one side of the rear sight notch, or be moved above or below the horizontal surface of the rear sight. Sight alignment, quickly regained after recoil without the need for correction, speeds up recovery and improves timed and rapid fire control. Maintaining sight alignment should be an effortless action before the next shot. Positive trigger pressure can be applied if the sight alignment is being maintained without effort. Sight alignment is easier to maintain if no adjustments are necessary such as moving the wrist or head.

b. Grip the pistol firmly enough while firing a shot so that shifting or slipping of the grip will not cause loss of control of the pistol. Recovery from recoil for the next shot in sustained fire is seriously hampered by the loss of sight alignment. The trigger pressure under these conditions is usually reluctant and timid. Unless the proper grip can be renewed quickly, (next to impossible in the middle of a timed or rapid fire string) maintaining sight alignment during the application of positive trigger pressure is a difficult operation. The tighter the grip, short of setting up a tremble, the better the control. The degree of pressure that should be exerted in gripping the pistol is determined by the condition of the muscles that do the gripping. Frequent practice, experience and certain exercises promote a strong grip and have a bearing on when a tremble will begin.

c. There must be no change in the tightness of the grip because a variation of gripping pressure will adversely effect sight alignment. Any degree of tightening or loosening of the grip from an established grasp will cause the sights to move out of alignment. The pressure of the grip must remain constant. It cannot be increased or decreased as trigger pressure is being applied because sight alignment will be altered.

d. The trigger finger should apply positive pressure on the trigger as an independent action, completely free of the other muscles of the shooting hand. The trigger finger should not touch the stock or the frame of the pistol because of the added friction and drag on applying trigger pressure. Dry fire a few shots watching the front sight carefully. If the front sight moves at the instant the hammer falls, reposition the trigger finger to the left or right, up or down, on the face of the trigger. Repeat the dry firing and adjusting the position of trigger finger until the release of the hammer causes no movement of the front sight in the rear sight notch.

e. There can be no variation in the grip from one shot to the next, from one series of shots to the next, from one day's shooting to the next, ad infinitum. In the final analysis, there is only one correct grip for each shooter. Each type of pistol, caliber . 22, caliber . 38, caliber .45 has its peculiarities and the shooter must adapt to each. The proper grip can be discovered through trial and error, practice and analysis. It must become, by extensive use, a familiar operation that eventually can be assumed without much difficulty. When the experienced shooter checks his grip out before shooting, it seldom needs adjustment. One of the frequent variations of grip that plagues new shooters is the grasping of the pistol grip with the hand slightly displaced to the right or left from the normal. As a result the placement of the trigger finger on the trigger will be different, thereby jeopardizing the requirement that the trigger be pressed straight to the rear.

f. The grip must be as comfortable as possible. The muscles of the hand and lower arm, after sufficient time has passed for the hand to become accustomed to the added stress, should experience little discomfort from the way the pistol is placed in the hand. If the grip is awkward and possible cramping and the hand muscles continue to tire easily, look for another solution or use an exercise device to strengthen the hand. To avoid the formation of painful, blisters, callouses and cracked tissue, reduce the tendency of the skin to stretch. Tautly stretched skin may also pull or exert force on the pistol frame in such a way as to cause eight alignment deviation. An equalization of the stretching of the skin and muscles of the gripping hand is paramount. Straight-in contact should exist between the skin of the fingers and palm and the surfaces of the frame and grips when the gripping pressures are brought to bear; not a sideward, sliding or grazing pressure.

g. The force of recoil must be controlled by being transmitted straight to the rear into the shooting arm. Recoil against the base of the thumb, which causes the weapon to twist in the hand, will allow a shift or grip and/or a bending of the wrist. Either event jeopardizes quick recovery from recoil in timed and rapid fire. The pistol should be held by being gripped normally, not by a choking grasp that endeavors to press on the stock in an all enveloping grab. The best points of pressure to hold the sight in alignment are the semi-flat grips on each side of the frame. However, the gripping hand cannot exert equal pressure on each of these surfaces simultaneously and such pressure would not overcome the effect of recoil. Therefore, the obvious pressure points of the shooting hand that will channel the effect of recoil straight to the rear and allow relative ease in maintaining sight alignment are: the middle bones of the three lower fingers, the base of the thumb high on the stock, the depression on the center of the heel of the hand, and last, the base joints of the four fingers along the upper palm. The primary pressure points on the .45 caliber pistol are the front surface of the grip and the mainspring housing-grip safety surfaces. The secondary points

are: high on the left side of the stock near the slide lock and the forward curve of the right grip, each of which have to have gripping pressure applied equally to prevent loosening of the over all grip, and to maintain sight alignment.

h. Holding the grip too long without an occasional relaxation will result in early fatigue. Fatigue destroys control. Excessive force of gripping for control of the pistol assures that fatigue will exist if the gripping power of the hand is weak. Undue fatigue in the muscles of the hand and forearm will also cause erratic application of trigger pressure. The tremble level is lowered to a point where the shooter cannot hold the pistol still, even for a few seconds, while trigger pressure is being applied.

3. Method of getting the proper grip: The proper grip must conform to all of the foregoing requirements plus it must be a hard grip and it must be adapted to the hand of the individual shooter.

NOTE: FOR THIS INSTRUCTION IN OBTAINING THE PROPER GRIP, THE WEAPON IS THE .45 CALIBER SERVICE PISTOL. THE FOLLOWING STEP-BY-STEP SEQUENCE WILL PROVIDE THE PROPER GRIP:

a. With the non-shooting hand, pick up the pistol by the barrel and of the slide, being careful not to mar the blackened sight and keep the muzzle pointed down range.

b. Spread the index finger and thumb of the shooting hand apart to form a "V", with the thumb held slightly lower than the index finger.

c. Bend the wrist slightly downward to obtain proper angle of contact.

d. Fit the pistol into the "V" of the thumb and index fingers by seating the grip safety straight and firmly into the loose "web" of akin in the "V".

e. Press downward on the barrel to pivot and push the mainspring housing firmly against the inside of the bulge of flesh at the base of the thumb and into the depression in the approximate center of the heel of the palm.

f. Stretch the fingers forward, letting the trigger finger come to rest flat against the pistol frame just above the trigger guard. Safety dictates the trigger not be contacted at this time.

g. The lower three fingers should come to rest closely touching each other, with the center bone of each finger resting on the curved front surface or "front strap" of the receiver. Little or no pressure should be exerted on the finger tips extending around the front strap to the surface of the left handgrip. Pressure exerted on the front strap by the little finger should be lighter than that brought to bear by the middle and ring fingers. Too much pressure with the little finger may cause the muzzle to depress slightly, resulting in the front sight aligning low in the rear sight notch.

h. The thumb should be raised to a level higher than the index or trigger finger. Only the joint at the middle of the thumb is high against the stock in the vicinity of the slide safety. The end of the thumb is turned up and away from the stock as it has no function. Pressure exerted on the aide of the pistol by the end of the thumb has a tendency to disturb sight alignment. The thumb should not exert great pressure on the aide of the pistol as early fatigue will result. Only required substantial supporting force should be exerted to hold the weapon firmly in place in the shooting hand.

i. A controlling grip can be affected by the three lower fingers directing primary pressure on the front strap straight to the rear, pressing the mainspring housing and grip safety firmly against the side of the center depression and the heel of the palm at the base of the thumb, and the loose flesh in the "V" of the thumb and index finger, respectively. This can be compared to a vise with the inner surfaces of the palm as the stationary jaw of the vise and the three lower fingers pressing on the front strap of the pistol as the moving jaw.

j. The non-shooting hand should be used to adjust the "fit" of the pistol into the shooting hand. A slight rotation of the weapon in the gripping hand as it is alternately gripping and releasing will allow the equalizing of a forceful grasp. The gripping hand must reach around to the right far enough to allow the trigger finger to reach into the trigger guard and also to position itself

on the trigger at the exact point at which the trigger pressure can be applied straight to the rear. According to the size of the hand, the trigger finger will apply pressure with the tip, ball of the first section or the crook of the first joint or elsewhere. The primary concern is not what portion or spot along the trigger finger is the standard point of contact, but at what spot on the finger you can bisect the trigger, press straight to the rear without disturbing sight alignment.

k. When the "fit" is correct, remove the trigger finger from the trigger, free the pistol from the non-shooting hand and tighten the grip with great force until a tremor is noticed. Release a small percentage of this gripping pressure immediately, enough so that the tremor disappears and leaves the shooter with a hard, solid grasp that will result in absolute control. The tighter the grip, the better the control. The shooter is now exerting correct pressure for maximum recoil control.

4. Checking For Proper Grip: The proper grip is a natural grip that will meet all the requirements in paragraph 2, above. To assure a proper grip, it should be checked against the requirements. A deciding factor in knowing whether your grip is proper is one of familiarity. By use of the proper grip innumerable times, a flaw is immediately sensed.

   a. To assure the sights will stay in alignment, the following test is made: extend the shooting arm and observe the sight alignment. If the front and rear sights are out of alignment, grasp the barrel with the non-shooting hand, loosen the grip sufficiently to slide the pistol in the hand, rotating it slightly away from the direction of error in sight alignment. Re-grasp the pistol firmly and extend the arm. Check the alignment without an effort being made to align them by wrist or head movement. If the alignment is natural, you may check for maintenance of sight alignment. With the arm extended, close the eyes, raise and lower the arm and settle. Open the eyes and observe. If the alignment has deviated, reposition the pistol in the shooting hand and repeat the closed eye test until natural alignment of the front and rear sights is achieved and maintained. During shooting, a constant check should be conducted of the tendency of the sights to continue to align themselves. The grip obtained at the beginning of shooting will not necessarily remain correct because the jolting recoil and build-up of fatigue will require correction to the grip to maintain sight alignment.

   b. To check for a grip firm enough to prevent shifting after making sure the pistol is unloaded, have the coach bump the pistol rather forcefully, up or to the aide with the heel of his hand. Also, have the coach grasp the pistol by the barrel and make an effort to tear it from your grasp.

   c. To check for variations in tightness or correctness of grip, it is best to dry fire a few shots before live shooting starts and watch for slight variations in sight alignment.

   d. Checking for independent trigger action should be accomplished before shooting by a visual check of the trigger finger clearance from the grip. Check by dry firing to detect any drag or undue friction noticed in the trigger. Also, check for a sympathetic tightening of the muscles of the hand as trigger pressure is applied. This can cause as much disturbance of sight alignment as the failure to press the trigger straight to the rear.

   e. The rapid onset of fatigue and soreness of the shooting hand is usually the result of an incorrect grip.

   f. Checking for straight to the rear recoil directly into the shooting arm and shoulder can best be done in practice with an unloaded pistol by having a coach or team mate stand in front of you and forcefully and abruptly push against the muzzle of your tightly gripped pistol driving it straight back toward your shoulder in simulation of recoil action.

5. Aids to Developing a Good Grip: The great pistol shooters have: strong hands and a hard grip; a method of gripping without change unless analysis dictates a change that will improve it; a different grip mastered for each shape of stock or different type of pistol; molded, shaped or custom grips, that fit perfectly; and if they use powdered rosin or a like substance, they use it every time the hand becomes moist before they grip the pistol.

   a. The "top guns" have a grip like a vise. Exercise devices such as rubber balls, spring grip builders, etc. will develop a strong grip. Exercise devices require constant use. Another approach, to reduce reliance on artificial exercisers, is to engage in work or a sport that

places demands on your manual strength and dexterity, for example, chopping wood, digging in the garden, using hand clippers on the hedge; playing tennis, baseball, ping-pong, etc. Use of the hands in meticulous work also develops an exacting touch and coordination that is valuable to the pistol shooter.

b. Never thoughtlessly change your grip. A correct grip is a precious commodity. It evolves from much hard work, thinking, and planning, plus painstaking analysis. Each satisfactory grip found among the better shooters comes from trial and error. The good grip that is the end product of much effort should not be changed except when sharply critical analysis dictates a change that will improve it. The shooter who is desperately changing his grip hoping that he will chance upon the right solution will generally lower his scores. In the event that a better score is fired under these conditions it comes on an occasional basis with no tangible reason for the improvement. Analysis and trial, in a never ending quest to improve your marksmanship, is the answer.

c. A modification of the shooter's proper grip is necessary on different types of pistols. The firmness of the grip remains the same for all calibers and types of pistols and revolvers, but nature of the grasp must correspond to the shape and size of the grips in meeting all the requirements of the proper grip. For example, the caliber .22 grip is sometimes found to be smaller in circumference than a caliber .45 pistol. In this instance, the reach of the lower three fingers may extend further around the stock, resulting in one of the primary pressure points (the middle bones of each of the three lower fingers) coming to rest beyond and partially around to the left side of the front strap. Pressure exerted would not be straight to the rear. As it is fully applied in the normal grip, it would no doubt effect the natural alignment of the sights. Also, shooters with small hands have trouble with stocks of varying sizes. One example is having to compromise, due to a short trigger finger which can reach the trigger only with the finger tip, between a straight to the rear trigger pressure and the best position of the pistol in the shooting hand that tends to give natural sight alignment.

d. Shaped, molded or tailored custom grips are required to fit perfectly. Fitted grips are primarily used to help the shooter who can't consistently duplicate the proper grip when using standard factory grips. The individual shooter must first decide what features and characteristics of a shaped grip suit his hand. Stocks can be made to fit exactly, but it is a difficult job. Only an experienced shooter is capable of knowing what he actually needs in a custom grip, because only he knows what his proper grip looks and feels like.

e. Powdered rosin dusted on the hand can help to maintain a solid, controlling grip but it is not absolutely necessary. Normally, a strong hand and the checkering and stippling on the stocks and metal surfaces is sufficient. In hot weather when the hand may perspire or a hand that becomes wet in the rain may cause slippage, powdered rosin or a like substance, that will temporarily dry the skin of the palm and fingers, is then justified.

In the final analysis, there is only one correct grip for you. It is one that is firm; affords the individual shooter the maximum degree of control over maintaining sight alignment and allows positive, straight to the rear pressure on the trigger without disturbing sight alignment.

D. BREATH CONTROL.

The correct method of breathing is an essential part of the shooter's system of control. Most pistol shooters know less about the proper method of breath control than of any of the other fundamentals.

The object of proper breath control is to enable the pistol shooter to hold his breath with a comfortable feeling long enough to fire one shot slow fire; five shots in twenty seconds timed fire; or five shots in ten seconds rapid fire without loss of the ability to hold still or concentrate on sight alignment.

1. To be Effective, Breath Control Must Be Employed Systematically and Uniformly: The ability to concentrate and maintain rhythm is aided.

    a. Promote a steady hold: It is generally known that one must not breathe during aiming. Breathing is accompanied by the rhythmical movement of the chest, abdomen, and the shoulders. This causes the pistol to move about excessively, making it almost impossible to produce an accurate shot. Therefore, one must not simultaneously breathe and try to fire a shot, but must endeavor to hold the breath for a short period of time.

b. The physiological processes involved in breathing: The shooter however, must not view the breathing process solely from the movement of the chest and the gun. He must not forget that the process of breathing, which consists of a combination of processes which occur constantly in the human body, determine in general the condition of the human being. Therefore, proper breathing is of great importance during shooting exercises which last several hours. Incorrect breathing technique has an adverse effect upon shooting, especially if the concentration is disturbed by sensing of the need to breathe.

(1) During the process of breathing, there is an alternating increase and decrease in the volume of the chest, as a result the person inhales and exhales. A person inhales when the dimensions of the chest increase. Once inside the lungs, the air provides oxygen to the blood and in turn it absorbs carbon dioxide and aqueous vapors. Exhalation occurs when all the muscles relax, the diaphragm presses upward, and, under the action of the weight of the chest and the elasticity of the lungs, air is forced out of the body. Exhaling does not require muscular effort; it occurs as the result of the resiliency of the ribs and the muscular tissues and the elasticity of the lungs.

(2) When breathing calmly a person produces an average of 12 - 13 respiratory cycles a minute. Consequently, one respiratory cycle lasts 4 - 5 seconds. If one traces the respiratory cycle, it is not difficult to note that the strained position of inhalation is replaced very quickly by exhalation. The very next inhalation begins after a respiratory pause of 2 to 3 seconds, (figure 1-7) during which time the carbon dioxide accumulates in the lungs. The duration off the respiratory pause is determined by the ratio of oxygen and carbon dioxide in the air remaining in the lungs.

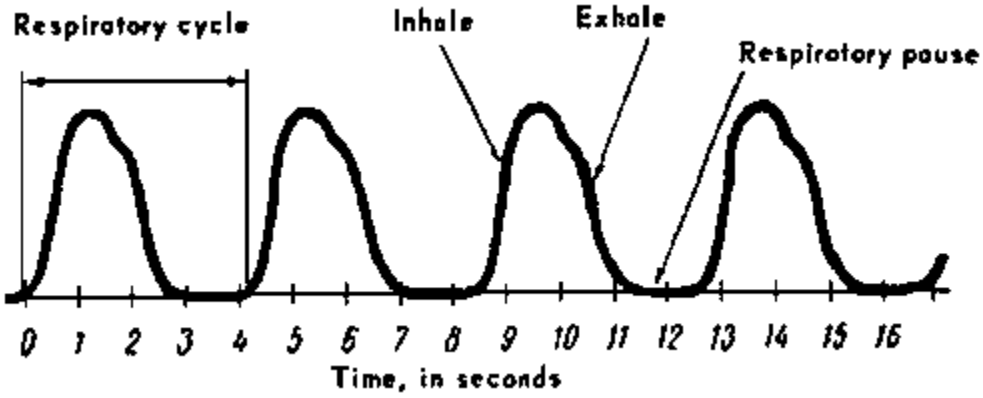


Figure 1-7. Scheme of a Person's Breathing.

(3) The respiratory pause and the problems of the ventilation of the lungs are of great importance to the shooter. It is obvious that during aiming and applying pressure on the trigger, the breath must be held only after the shooter has exhaled, timing it so that the breath is held at the moment of the natural respiratory pause. During that time the muscles are not strained and are in a relaxed state.

c. A person can prolong by several seconds this respiratory pause, that is, hold his breath comfortably for 15 - 20 seconds, without any special labor and without experiencing unpleasant sensations. This time is more than adequate to produce a shot or shots. Experienced shooters usually take a deep breath before firing and then, exhaling slowly, hold their breath gradually, relax and concentrate their entire attention upon sight alignment and the smooth application of pressure on the trigger (Figure 1-8).

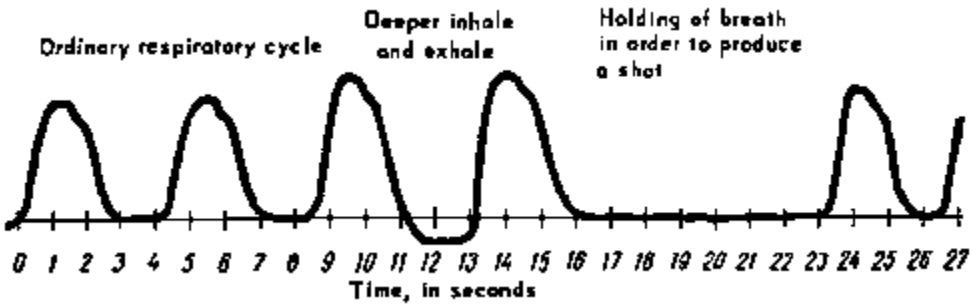

Ordinary respiratory cycle
Deeper inhale and exhale
Holding of breath in order to produce a shot
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
Time, in seconds

Figure 1-8. Scheme of the Manner in Which A Person Holds His Breath in Order to Produce a Shot.

2. Recommended method

   a. Prior to fire commands:

      (1) When expelling the air from the lungs before aiming, no effort whatever must be exerted. The exhaling must be natural and free, as in ordinary breathing. The air must not be held in the lungs; incomplete exhaling before aiming leads to straining and to stimulation of the nerve centers regulating the breathing, and the shooters concentration on aiming is distracted.

      (2) In order to make sure that during prolonged firing the interruption of the rhythm of breathing does not have an influence upon the shooter, the breath must not be held for an excessive period when trying to fire a slow fire shot. If the shooter does not produce a shot in 8 - 10 seconds, he must stop aiming and take another breath.

      (3) Before holding his breath for the next shot he must empty his lungs well, taking several deep breaths. The same should be done between shots and strings of shots throughout the firing. This facilitates the lengthening of the respiratory pause before aiming and provides for regular rest between shots and strings. The oxygen level in the blood is slightly increased. As a result the shooter is relaxed and comfortable during all shooting without excessive and premature fatigue.

   b. During the fire commands: Take a deeper than normal breath at the command, "READY ON THE RIGHT", take another at "READY ON THE LEFT", extend your pistol and take the final breath and exhale to the point of comfort at "READY ON THE FIRING LINE".

      As the shooter gains experience in proper breath control, he will find that he will hold his breath, or extend his normal respiratory pause, without being too conscious of the action and allow intense concentration on sight alignment and trigger pressure.

   c. During actual firing: The shooter should not be conscious of the need to breathe. If during practice a shooter finds that he cannot hold his breath the twenty seconds necessary to fIre a timed fire string, he should make a practice of firing his timed fire strings in less than twenty seconds. However, if during a timed or rapid fire string, the shooter feels compelled to breathe, he should take a short breath quickly and continue to fire. This causes a lapse of concentration on sight alignment and should not be the normal technique used.

Chapter II

Sight Alignment

Sight alignment is the most important contribution to firing an accurate shot.

In order for the bullet to hit the center of the target, the shooter must aim the pistol and give the barrel a definite direction relative to the target.

In theory, accurate aiming is achieved when the shooter places In exact alignment the rear sight with the top and sides of the front sight and holds them In alignment In the aiming area.

A requisite for correct aiming is the ability to maintain the relationship between the front and rear sights.

When aiming the front sight is positioned in the middle of the rear sight notch with an equal light space on each side. The horizontal top surface of the front sight is on the same level as the top horizontal surface of the rear sight notch (Figure 2-1)

A. RELATIONSHIP OF SIGHTS.

It is necessary to be acutely aware of the relationship of the rear sight to the clearly defined front sight. Normal vision is such that the rear sight of the pistol will be as nearly In focus as the front sight. Some shooters may be able to see only the notch of the rear sight In sharp focus; the outer extremities may become slightly blurred.

Figure 2-1. The Relationship of the Sights.

1. Angular Shift Error: If the shooter does not observe correct aiming (maintaining the top surface of the centered front sight on a level with the top of the rear sight and equal light space on each side of the front sight) there will be few accurate shots. Most often, he locates the front sight in a different position In the rear notch. This accounts for a greater dispersion of shots on the target, since the bullets will deviate In the direction In which the front sight is positioned In the notch. (Figure 2-2). This aiming error is known as angular shift error.

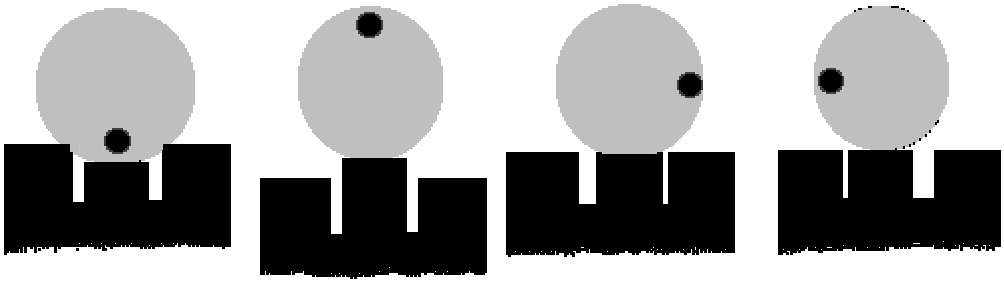


Figure 2-2. Displacement of the Bullet When There Is Angular Shift Error in the Alignment of the Front Sight.

2. Parallel Shift Error: If the hold (arc of movement) is deviating In near parallel error from the center of the aiming area, the shooter should know that these deflections will not lower the score to the extent of angular shift error. Therefore, sight alignment is the most critical of the two. Thus, the accuracy of a shot depends mainly upon the shooter's ability to consistently maintain correct sight alignment. The main effort should be toward keeping your sights aligned, Holding the pistol perfectly still is desirable but It is not mandatory.

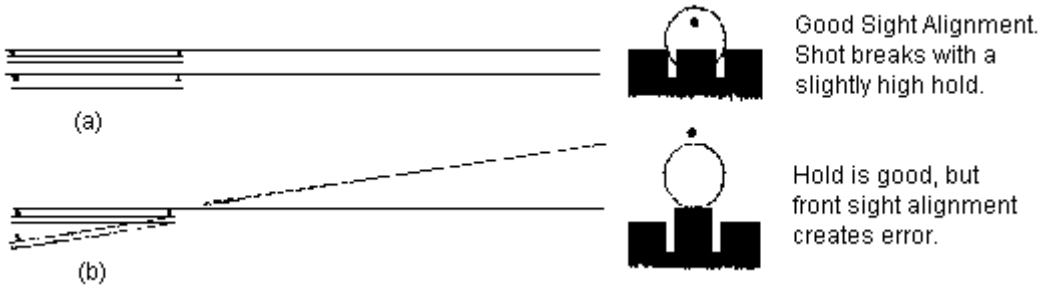


Figure 2-3, Displacement of the Bullet When The Pistol is Shifted: (a) Parallel, (b) Angular

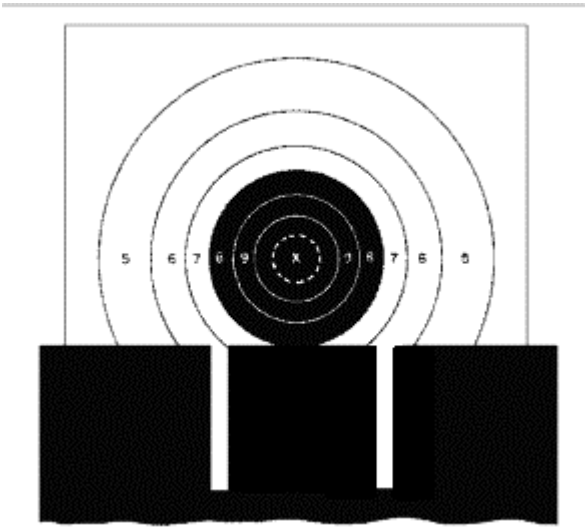


Figure 2-4a, Impossible! The Human Eye Cannot Focus On A Close-UP Object and A Distant Object Simultaneously.

B. POINT OF FOCUS.

Correct sight alignment must be thoroughly understood and practiced. It appears on the surface as a simple thing - this lining up of two objects, front and rear sights. The problem lies in the difficulty in maintaining these two sights in precise alignment while the shooter is maintaining a minimum arc of movement and pressing the trigger to cause the hammer to fall without disturbing sight alignment.

The solution is partly in focusing the eye on the front sight during the delivery of the shot.

Figure 2-4b. Improper. Control of sight alignment is not precise. Distinct focus on target renders sight indistinct. Error incorporated here is the same as Figs 34a and is not as readily apparent.

Figure 2-4c. Proper. Control alignment is precise. Focus limited to front sight only, renders the sights distinct and target indistinct and sight relationship can be controlled constantly.

1. It is imperative to maintain 'front slight point of focus" throughout the sighting and aiming of the pistol. The shooter must concentrate on maintaining the correct relationship between front and rear sight, and the point of focus must be on the front sight during the short period required to deliver the shot. If the focus is displaced forward, and the target is momentarily in clear focus, the ability of shooter to achieve correct sight alignment is jeopardized for that moment. Frequently, this is the moment that the pistol fires. A controlled, accurate shot is impossible under these conditions.

2. When the eye is focused on the target the relatively small movement of the arm appears magnified. However, when the eye is correctly focuses on the front sight this movement appears to have been reduced.

C. CONCENTRATION.

1. If the sights are incorrectly aligned, the net result is an inaccurate shot. Carelessness in obtaining correct sight alignment can usually be traced to the shooter's failure to realize its importance. Many shooters will, in the initial phase of holding, line up the sights in a perfect manner. However, as the firing progresses, and the shooter is concentrating on delivering the shot, he often loses correct sight

alignment which he attained in the initial phase of his hold. Usually, when the shooter is unable to maintain a pln-point hold, his concentration on sight alignment wavers. An accurate shot is lost because the shooter is thinking of his arc of movement and not the perfection of sight alignment.

2. Another factor which contributes to the deterioration of sight alignment, is the feeling of anxiety which arises over the apparently stationery pressure on the trigger when attempting to fire. An impulse is generated to got more pressure on the trigger, so that the shot will be delivered. When the shooter thinks about increasing the trigger pressure, a degree of the intense concentration required to maintain correct sight alignment is lost. Even if trigger control and the hold are good, the net result will be a poor shot. Sight alignment must remain uppermost in the shooter's mind throughout the firing of the shot. Positive trigger pressure must be applied involuntarily. Consistently accurate shots are produced when the shooter maintains intense concentration on sight alignment during the application of trigger pressure, while experiencing a minimum arc of movement. Control of the shot is lessened in direct proportion to the loss of concentration on sight alignment.

3. The average, advanced shooter is probably limited in sustained concentration to a period of 3 to 6 seconds. This short space of time is the optimum period in which a controlled shot can be delivered. This concentration interval should be attained simultaneously with acquiring a minimum arc of movement, a point of focus, satisfactory sight alignment, and the involuntary starting of positive trigger pressure. If exact sight alignment is maintained, and the trigger pressure remains positive, the shot will break during the limited time the shooter is able to control his uninterrupted concentration. Result! A dead center hit on the target.

D. THE EYE.

The principal difficulties which confront the shooter during aiming are determined to a great extent by the inherent characteristics of the eye and its work as an optical apparatus. All shooters should familiarize themselves with the optical properties of the human eye as explained in Annex II, entitled "Optical Properties of the Human Eye Relevant to Sight Alignment".

Chapter III

Trigger Control

A. GENERAL.

Correct trigger control must be employed in conjunction with all other fundamentals of shooting. The physical act of applying pressure on the trigger to deliver an accurate shot may vary from individual to individual. Proper trigger control for each individual gradually assumes uniformity when the techniques of proper application are mastered. Many shooters, for example, maintain a degree of trigger control with a relatively light grip, while another shooter may use a very tight grip. Some shooters prefer to apply consistent trigger pressure at a rapid rate, while maintaining correct sight alignment. For another shooter, a slower, deliberate application may achieve the same results. An ever increasing number of shooters use the positive approach to trigger control, that is, once it is initiated, it becomes an uninterrupted, constantly increasing pressure until the weapon fires.

Trigger control is of very great importance in producing an accurate shot. When the shooter exerts pressure on the trigger, he must do so in a manner that does not alter the sight alignment, or position of the pistol. Consequently, the shooter must be able to exert smooth, even pressure to the trigger. Furthermore, the trigger must be pressed in conjunction with maximum concentration, peak visual perception of sight alignment and minimum arc of movement.

In order to produce an accurate shot, the shooter must carry out many diverse, but related, actions. Fulfilling this action is compounded by the fact that the pistol is in some degree of motion throughout the period of sighting and aiming. The movement varies according to the stability of the shooter's stance. Consequently, the sight alignment deviates from the aiming area. Often it will move through the aiming area, pausing only for a short period of time in perfect alignment with the target. It is impossible to determine when, and for how long the properly aligned sights will stay in the center of the aiming area. This difficulty is aggravated further by the fact that the shooter is trying to execute coordinated actions when reflex action seeks to contradict them. Such a situation requires the development of conditioned reflexes, and improvement of coordination.

The coordinated action of correct aiming, timely pressure on the trigger, and the correct delivery of the shot is difficult and can be accomplished only by overcoming former uncoordinated reflexes or by acquiring new ones. Only through constant training and attention to accepted techniques can these new reflexes be acquired. The peculiar nature and characteristics of the human nervous system are covered in detail in Annex III entitled, "Processes of the Human Nervous System Relevant to Equilibrium, Trigger Control and Hearing".

B. FACTORS PROVIDING FOR THE CORRECT CONTROL OF THE TRIGGER.

The pressure put on the trigger must come from independent movement of the trigger finger only. The gripping fingers and the thumb do not move or tighten. Keep the grip pressure constant. Align the sight, settle into your normal aiming area and exert positive, uninterrupted, increasing pressure, straight to the rear, until the hammer falls. You must not look for a perfect sight picture combination of rear sight-front sight-bull's eye. Instead, focus your eye on the front sight, keeping it perfectly aligned in the rear sight notch. The blur of the out-of-focus target may move about slightly, but this movement is relatively unimportant. Any time the weapon is fired with good sight alignment within the normal arc of movement and it is a surprise shot, the shot will be a good one, and will hit the target within your ability to hold.

Trigger control has a series of actions that take place if a smooth release of the firing mechanism is

accomplished.

1. Slack and Initial Pressure: Any free movement of the trigger, known as slack, has to be taken up prior to a light initial pressure. This action assures that the tolerances in the firing mechanism linkage are taken up and are in firm contact before positive trigger pressure is applied.

   Initial pressure is an automatic, lightly applied pressure, approximately one-fourth or less of the total required to fire the weapon. This careful action is an aid in the positive pressure that will release the hammer quickly and smoothly.

   In order to fire a controlled shot the shooter must learn to increase the pressure on the trigger positively, smoothly, gradually, and evenly. This does not mean, however, that the trigger must be pressed slowly. It must be pressed smoothly, without interruption, but the release of the trigger must take no more than 2 to 5 seconds. Numerous accurate rapid fire strings of five shots in ten seconds are fired in a cycle that allows only one second or less to employ the principals of correct trigger control.

   Smooth trigger action makes special demands on the trigger finger when pressing upon the trigger; its correct functioning determines to a great extent the quality of the shot. The most carefully attained sight alignment will be spoiled by the slightest error in the movement of the trigger finger.

2. Function of Proper Grip: In order for the index finger to be able to perform its function without spoiling the aim, it is first necessary to have the hand grasp the pistol correctly and create the proper support; permitting the trigger finger to overcome the trigger tension. The pistol grips must be grasped tightly but without any tremor. It is also necessary that the index finger clears the side of the stock. The movement of the index finger must be independent as it presses on the trigger, and also not cause any lateral change to the sight alignment.

3. Proper Placement of the Trigger Finger: It is necessary to apply pressure on the trigger with either the first bone section of the index finger, or with the first joint. The trigger must be pressed straight to the rear. If the finger presses the trigger to the side, undesirable things will happen. The weight of trigger pull will increase; because of additional friction on certain parts of the trigger mechanism an otherwise flawless trigger action will take on the characteristics of a poor trigger when side pressure is exerted on the trigger. Another consideration is the effect that side pressure has on sight alignment. Only slight pressure to the side is required to bring about an error in sight alignment. The prime cause of exerting pressure to the side is improper placement of the trigger finger.

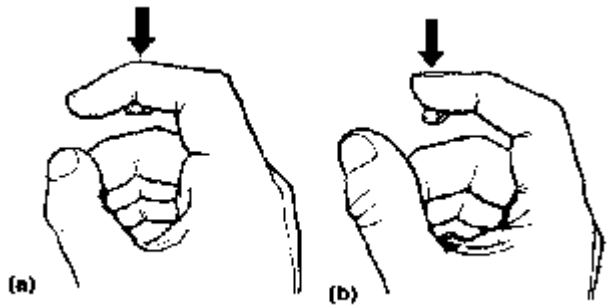


Figure 3-1. Correct Placement of the Index Finger on the Trigger. (a) With Joint of Index Finger. (b) With First Bone Section of Index Finger .

   Ideal trigger finger placement may be modified to a degree by the requirement that the grip provide a natural alignment of the front and rear sights. The shooter frequently must make a compromise to overcome the undesirable effects of not being able to utilize each factor to full advantage.

4. Coordination: It must be emphasized that match shooting is successful only when all the control factors are consistently in coordination.

Ability to control the trigger smoothly is not sufficient in itself to produce an accurate shot. The trigger must be activated in conjunction with correct sight alignment, minimum arc of movement, and maximum undisturbed concentration. This might be called cadence, rhythm or timing. Under any name, it comes only to those who practice frequently. Occasional ability is not the answer to championship shooting. A three-gun aggregate requires 270 successful results. Consistent, exacting performance is enhanced by an ability to compensate automatically for errors. It is necessary during firing to press the trigger under varying conditions of pistol movement in conjunction with correct sight alignment. In order to apply coordinated pressure on the trigger, the shooter must wait for definite times when all factors and conditions are favorable. Frequently, it will be impossible to exercise maximum control. However, the shooter must never attempt to fire until he has completely settled into a minimum arc of movement.

C. APPLICATION OF TRIGGER PRESSURE.

1. Positive Uninterrupted Trigger Pressure - Surprise shot method - is primarily the act of completing the firing of the shot once starting the application of trigger pressure. The shooter is committed to an unchanging rate of pressure, no speed up, no slowdown or stopping. The trigger pressure is of an uninterrupted nature because it is not applied initially unless conditions are settled and near perfect. If the perfect conditions deteriorate, the shooter should not fire, but bench the weapon, relax, re-plan, and start again.

   In instances when the pistol is stable and steady, and the periods of minimum arc of movement are of longer duration, it is immaterial whether the release of the trigger is completed a second sooner or a second later. Anytime that the shot is fired with minimum arc of movement and the sights are in alignment, it will be a good shot. Therefore, when the shooter has established stable minimum arc of movement and sight alignment, he must immediately begin to press on the trigger, smoothly but positively, and straight to the rear without stopping, until a shot is produced. This method of controlling the trigger action will give the shooter a surprise break of the shot before any muscular reflex can disturb sight alignment.

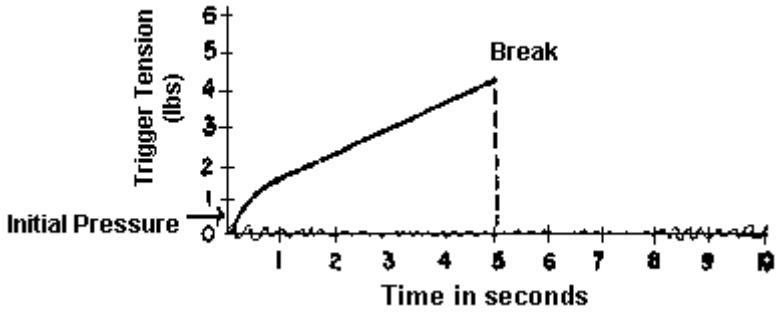


Figure 3-2. Surprise Shot with Positive Uninterrupted Trigger Pressure.

2. Interrupted Application of Trigger Pressure or the "Point" shooting Method: This is a method of trigger control not recommended, although used by some shooters. Some shooters think they can pick the trigger release time even after years of experience.

   a. The shooter will align the sights and exert initial pressure on the trigger. He will then make every effort to hold the weapon motionless. During extremely brief moments of motionlessness, pressure is applied on the trigger. If the sight alignment changes and is not perfect, or the arc of movement of the weapon increases, the pressure on the trigger is halted and trigger tension maintained. When sight alignment is again perfect and movement diminishes, pressure on the trigger is resumed until the shot breaks, or after the slack in the trigger is taken up, initial pressure is applied and the shot released by a single swift movement of the trigger finger when there is a decrease in the minimum arc of movement. In this case the presence of perfect sight alignment is not considered essential in initiating trigger action. Abrupt action in applying trigger pressure will disturb the existing sight alignment and other fundamental control factors are subordinated to a minimum arc of movement. The application of all other fundamentals is required regardless of whether or not they are optimum.

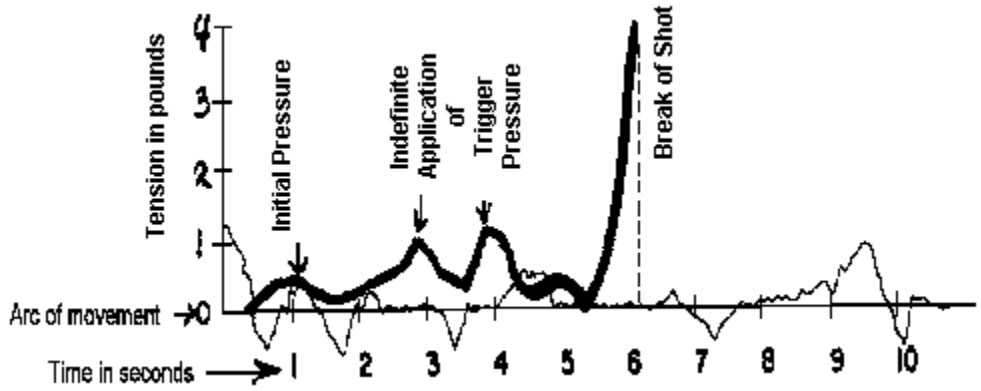


Figure 3-3. Application of Trigger Pressure When Based on Perfect Sight Picture.

b. While applying positive trigger pressure straight to the rear, if any thought enters the shooters mind to speed up or slow down this trigger pressure, it will result in the concentration on sight alignment being broken down.

c. The decision to increase the trigger pressure may result in a reflex action commonly known as anticipation and usually results in heeling the shot (The bullet strikes the target at approximately one o'clock). The recoil becomes more imminent and the brain will send a signal for the arm and hand muscles to react prematurely a split second before the shot is fired; resulting in frequent bad shots and low scores.

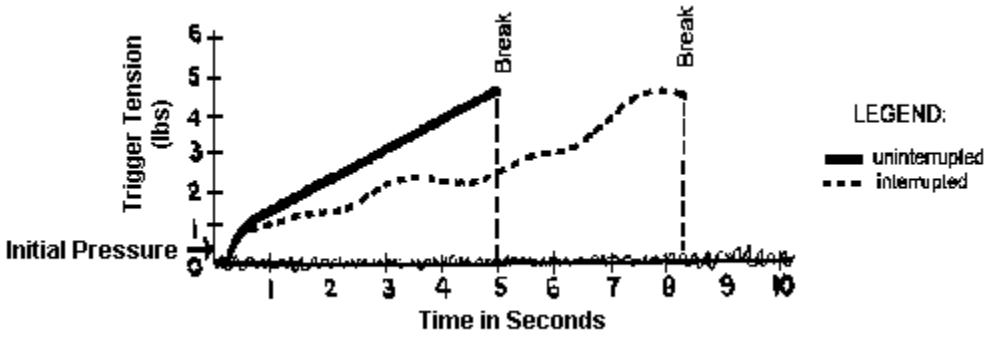


Figure 3-4. Shot fired With interrupted Trigger Pressure Compared to Shot Fired With Uninterrupted Positive Trigger Control.

D. ERRORS MADE IN TRIGGER CONTROL AND MEANS OF COMBATING THEM.

1. The most serious and disrupting error made by the shooter is jerking - that is, the abrupt application of pressure on the trigger accompanied with muscular action of the hand and arm muscles.

   If Jerking was limited to abrupt pressure on the trigger, and the rapid displacement of the axis of the bore, it would cause only part of the results.

   a. Jerking is usually accompanied by:

      (1) The sharp straining of all the muscles in the arm arid shoulder.

      (2) The abrupt tightening of the hand on the grip.

      (3) Failure to press the trigger directly to the rear.

      All of these factors taken together, lead to a great shifting of the pistol to the side and down and only a very poor shot can result.

b. Most frequently, jerking is observed in new shooters. Usually because of a large arc of movement, favorable moments for producing a good shot are of very short duration.

c. The cause of trigger jerking is the practice of "snatching a ten-pointer", as the expression goes. The shooter tries to fire at the moment when the centered front sight, as it moves back and forth, passes under the lower edge of the bull's eye, or comes to a stop, for a brief time, near the center of the aiming area. Since these moments are fleeting the inexperienced shooter strives to exert all the necessary pressure on the trigger at that time. This rapid and abrupt trigger pressure is accompanied not only by the work of the muscles in the index finger, but also by the sympathetic action of a number of other muscles. The involuntary action of these muscles produces the "jerk", and the inaccurate shot that results. The young shooter, in anticipation of the recoil of the pistol and the loud noise, strains his muscles by flinching, to counteract the anticipated recoil. This is also known as heeling the shot.

d. Practice has shown that a young shooter must be warned sufficiently early in his training about the dangers of jerking the trigger and effective steps taken to instruct him in the correct technique of accurate shooting.

e. Difficulty In detecting errors In trigger control is frequently because the pistol shifted during recoil and errors are not recognized. The shooter has a more difficult time in evaluating than a coach, and often does not realize that he is jerking the trigger, blinking his eyes, or straining his arm and shoulder muscles.

f. The easiest way to correct jerking in the young shooter is by the coaching of an experienced coach. A coach can more readily detect errors and correct habits that will produce poor trigger control. Frequently a shooter does not consider it necessary to prove conclusively whether or not they are jerking on the trigger. It is necessary, though, to know that if he does not get rid of the detrimental habit of jerking on the trigger, he will never succeed in achieving good results.

g. Signs of jerking are an increased in the size of the area of the shot group or shots off to the side which are not called there; chiefly to the left and down (for righthanders). To correct the condition, the shooter must make a change In his training exercise, but in no Instance must he stop them.

(1) Dry-fire practice will enable the nervous system to rest from the recoil of the shot. By this practice some of the reflexes which are detrimental to firing (tensing of the arm In order to counteract the recoil, the straining of the muscles in anticipation of the shot, blinking from the noise of the shot), are not being developed. They will, In fact, begin to decrease and may completely disappear.

(2) Secondly, the shooter may continue regular training, but occasionally he may practice "dry". This way, he will not lose the stability of this position, as well as the useful reflexes which the shooter has developed during the process of previous firings.

(3) By aiming carefully and noting attentively everything that happens to the pistol when he presses on the trigger, the shooter will discover his errors and eliminate them. Training by means of ball and dummy and dry firing is of great benefit. It makes it possible to develop correctly and carefully the technique of pressing the trigger, and contributes to acquiring proper habits In controlling the trigger.

(4) When beginning to use dry firing the shooter must first overcome the desire to "grab" for a shot when the centered front site is under the bull's eye. Despite the arc of movement the shooter must teach himself only to press smoothly on the trigger and to use the uninterrupted positive control method of trigger action. When the smooth control of the trigger again becomes habitual and he no longer has to devote special attention to it, he can again shoot live cartridges. After starting again to shoot live cartridges, the first training exercises should involve firing at a square of blank white paper, rather than at a target with a black aiming area. Simultaneously, the shooter must devote special attention to analyzing his performance, counteract the desire to jerk on the trigger, and be conscious of reacting incorrectly to the firing of a shot.

2. Another error committed by a shooter when controlling the trigger is "holding too long", that is, the drawn out action of pressing the trigger.

a. A consequence of holding too long is that the shooter does not have enough air to hold his

breath, his eye becomes fatigued, and his visual acuity decreases. In addition, his stance loses part of its stability. Consequently, when he holds too long, the shooter presses on the trigger under unfavorable conditions.

b. Holding too long is a consequence of excessively slow and cautious pressure on the trigger. This is caused by the shooter's fear of producing a bad shot. Such indecisiveness and over caution may be regarded as the opposite of jerking. Moreover, holding too long stems from the lack of coordination of movement which frequently occurs during those stages of training when the process of inhibition outweighs the process of stimulation. Simply stated, the shooter cannot force himself to exert positive pressure on the trigger at the proper time. One favorable moment after another goes past, and soon the chances for an accurate shot are gone. Naturally, the trigger control phase has been extended far beyond its effective duration. This situation frequently occurs after a period of dry-fire training exercises. The shooter loses the sense of the trigger's true weight when he fires for extended periods of time with a round in the chamber. When the trigger is released in a dry shot, the trigger seems to be rather light, but when the shooter switches to live rounds, the trigger weight seems to be considerably greater. He feels he must exert greater effort to overcome this seemingly greater weight. Frequently, the shooter will blame his troubles on faulty adjustment of the trigger mechanism. Nothing is gained from such assumptions. More times than not, the shooter returns to normal trigger control since the root of the evil is lack of coordinated control and not trigger adjustment.

c. The restoration of coordination of movement, and the return to the correct balance between stimulation and inhibition is brought about primarily through systematic practice, match training and dry-fire exercises. It is precisely this method of training which develops the necessary coordination of the shooter's actions. When the shooter's movements become automatic, the trigger finger will operate in an unstrained manner, and the shot will break at the proper moment. It is important that each training session begin with a few dry-fire exercises. It has been demonstrated that such exercises are necessary for the development of accurate shooting. Such exercises may also be repeated after record shooting to restore equilibrium in the nervous processes.

d. Frequently, a shooter, when firing for record, is unable to fire a shot. After several unsuccessful tries, a loss of confidence will arise. Rather than risk a wild shot the shooter should unload the pistol, time permitting, and dry-fire a few shots. After restoring coordination of movement, and regaining his confidence, the shooter is far better prepared, both physically and mentally, for the delivery of an accurate shot. Firing the shot during the first few seconds after settling into a good hold, will guarantee confidence.

3. We have considered the fundamental errors that arise in trigger control. Let us now consider a problem that is also closely related to trigger control - trigger adjustment.

a. The firing of an accurate shot depends to a great extent on the quality of the trigger adjustment. An incorrectly adjusted trigger aggravates the errors committed by the shooter as he exerts pressure on the trigger. Incorrect adjustments include:

(1) Excessive trigger weight.

(2) Excessive long creep (movement of trigger).

(3) Too light trigger weight.

(4) Variable trigger weight.

b. The shooter should not try to overcome these difficulties with modification in his trigger control but take the problem and pistol to the armorer (gunsmith) for solution.

Chapter IV

Establishing A System

The requirement that 120-270 record shots be fired in one day of match shooting demands great expenditure of energy. For this reason the shooter must plan his actions with special care in order to use his energy intelligently and conserve his physical and mental strength for the duration of the shoot.

The best method in which the shooter can impart all of his shooting skill to his shooting is by careful organization of maximum control.

Most of the points lost in an aggregate score are slow fire points. It is therefore imperative that this stage of fire become the first goal of exact control. One shot in one minute is sufficient time to organize the delivery of each shot. Successful delivery is assured when control of the cycle of action and thought is uniformly established - prepare, plan, relax, deliver, analyze and correct.

A. PREPARATION

Complete preparation and prior planning is essential. The firer must be both mentally and physically ready. So that he can concentrate on performance he must have checked the range conditions, his equipment, zero of weapons, range commands, ammunition, etc. prior to actual participation on the line.

1. Zeroing:

   As a competitive shooter you must know how to zero your weapon in order to place the strike of the bullet in the center of the target.

   There is no excuse for losing points in competition due to an improperly zeroed pistol. Inexact zeroing is a demonstration of lack of preparation.

   a. There are two types of sights, fixed and adjustable.

      (1) You may have fired a pistol with fixed sights. It could be that you are using a pistol with fixed sights now. The fixed sights found on the . 45 caliber service pistol are somewhat difficult to adjust and therefore not primarily used for competitive shooting. For elevation correction, you must use the trial and error method of changing the sight height with a file, or, if a good armorer is available, he will be able to cut off the exact amount from the sights. Windage must be corrected by moving the rear sight with either a sight mover or a hammer and punch. You cannot have both a 25 yard and 50 yard zero in elevation with fixed sights. Your point of aim at 50 yards will be higher than at 25 yards. Correcting for windage with a fixed sight is very difficult due to the method used. Except for initial determination of normal zero for ideal conditions, it is recommended that fixed sights not be moved during competition.

      (2) Most pistols that are used in competition today are equipped with adjustable sights which are easily moved by a screwdriver or a small coin.

         (a) There are many makes of adjustable sights available on the market today. The sight adjustment screws do not all move in the same direction for a given adjustment. Clockwise will move one sight to the right and move another sight to the left. This also applies to elevation adjustment. Another difference is that each sight does not move the strike of the bullet the same distance per click. Some of these sights are more durable than others.

         (b) The primary consideration when you are using adjustable sights is that you know the

capabilities of your sights. How far one click in elevation moves the strike of the bullet at 50 yards, etc., on your pistol, is important to correct zeroing and adjusting.

(1) We recommend that you start your zero at twenty-five yards. Fire at least three rounds slow fire before moving the sights.

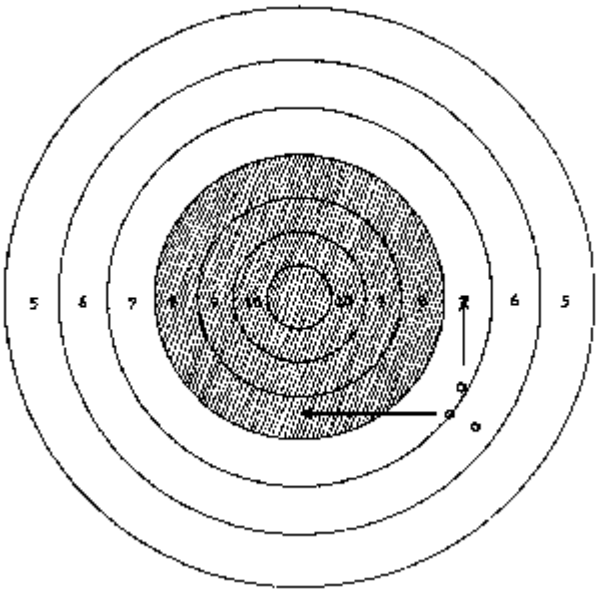


Figure 4-1. Sight Change Example.

(2) Check your group in relation to the center of the target and if necessary, make a bold sight change. Do not creep to the center of the target one click at a time. Also, repeat the shot group method to establish a 50 yard zero. Do not try to zero by moving your sights after you have fired only one round. One round can easily be off because of errors committed by the shooter.

(3) The shot group is equivalent to an 8 ring or a four inch error at 6 o'clock in elevation. If the sight moves the strike of the bullet one-half inch per click at 50 yards - approximately eight clicks increase in elevation are needed. The group is equivalent to 7 ring or five and one-half inch error in windage at 3 o'clock, approximately eleven clicks of left windage are needed. (Refer to scoring ring dimensions in Sight Adjustment Card)

(4) Exception to the shot group method may be made when a shooter with extensive experience is firing in a match and has called his shot good, but the shot was not located on the target in relation to his call. Analyze your shooting performance. You may determine that an immediate sight change is necessary, but do not be in too great a hurry to move your sights, as the chances for error caused by faulty technique are many.

(5) When the group is centered you may wish to fire 10 and 20 second strings to confirm the zero at 25 yards. There will possibly be a change required when shooting timed and rapid fire.

(6) Never "Hold Off" or use "Kentucky Windage" with adjustable sights. The shooter will force the shot to break at a specific spot instead of allowing the normal arc of movement. If you are grouping away from the center of the target, adjust the sights to compensate for the error. Mark and record your zero sight settings

   (a) It is a good idea to mark the sight adjustment screw with a small drop of nail polish or airplane dope to indicate the position of the 25 yard and 50 yard zero.

   (b) You may also set the elevation screw down to its lowest point, counting the clicks

as you do and record the number of clicks up from the bottom for both settings, This way you record the number of clicks from the base of the sight up to your 25 yard and 50 yard zero. (This method is used only for elevation.)

(c) You may also make a sight adjustment card on which you can record the zero position of the windage and elevation screw for all weapons. At certain times on different ranges, and under various weather and light conditions, you may find your zero changes slightly. (Figure 4-2).

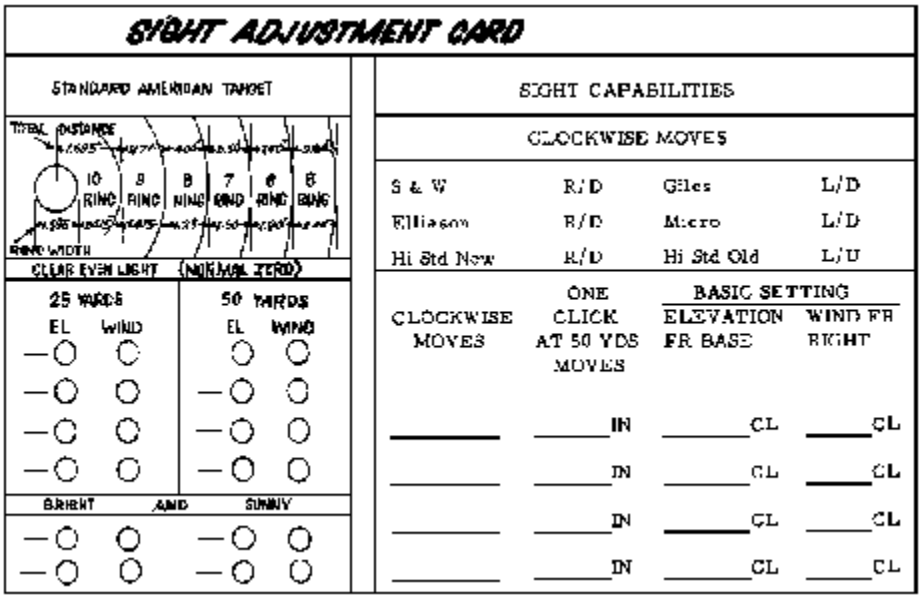


Figure 4-2. Example of Sight Adjustment Card.

(7) A scorebook which has provisions for you to write in your sight settings for specific ranges, light and weather condition, and hard to remember data is a necessary item of equipment (Figure 4-4). Unusual zero changes frequently appear without reason. Some things to check are as follows:

(a) Check the spotting telescope: You may be scoping the adjacent target. Adjusting your zero to compensate for another shooter's grouping frequently happens.

(b) Check front and rear sights. The sights may have become loosened from the recoil or bent or damaged. The rear sight may have worn notches in the adjustments and would allow recoil to disturb the sight setting or when an adjustment is attempted, the sight would not move in the desired direction.

(c) Errors in position and grip may cause the hold and sight alignment to drift even though the shooter may have made a correction. An artificial correction is made to compensate for errors. At the shoulder it affects the hold, and at the wrist it affects the grip. An integral shift in body position should be made by moving the rear foot in the direction of the error in the hold and the grip should be shifted by sliding the grasp of the hand on the grips of the weapon toward the error. If a natural position and grip are attained, the tendency to point at other than the aiming point will be removed.

(d) Positive action is urgently needed when any of the above situations are present. Make a quick check of the scope, position, and grip and then continue until it is apparent that the difficulty is not being remedied. A bold change in sight setting should now be made.

(e) In the case of a sight damaged beyond use, ask the range officer to permit you to declare the weapon disabled and change guns or have it repaired by a qualified

gunsmith on the range.

(f) The scorebook may indicate a large change in sight adjustment for the pistol range on which you are firing. Changes in light angle or light intensity may affect the zero that you use on the home range.

(8) Upon completion of firing, a consultation with your gunsmith might uncover certain changes in the fitting of components, wear, burrs or foreign matter that can alter the mating of finely fitted parts. Any of these may cause a change in zero.

2. Preparation in the Assembly Area: Before you can employ a systematic technique of shooting, a systematic preparation phase must be established. Actually the shooter's over-all preparation starts the first time he attempts to improve his shooting ability. However, important steps can be taken during the period immediately before shooting that will favorably affect control and coordination.

a. Physical: The shooter must first complete his preparation in order to fully concentrate on shot delivery. The important thing to remember is to perform all operations and checks before record firing. Otherwise, the shooter will have to alter his system of control to compensate for the time lost in searching for an emergency solution.

(1) A shooter should eat light but nourishing food so that there will be no feeling of hunger before shooting, or a sensation of being stuffed. Avoid drinking a lot of water before and especially during shooting. Heavy food and too much liquid raises the pulse beat and induces excessive perspiration, thus weakening the body during shooting.

(2) Before shooting the shooter should do mild limbering up exercises: static tension exercises, walking, dry firing, etc., will revive blood circulation after sleep and help balance the nervous system. If a shooter starts shooting shortly after awakening, without limbering up, he will not be steady. His reactions are too slow, and his movements will lack coordination.

(3) The shooter should report to the range at least 15-30 minutes prior to firing time. This is necessary for equipment preparation and the shooter will also have a chance to relax and become settled during this period. Carrying a heavy gun box puts a strain on the shooter and no effort should be made to shoot for a period after such exertion.

(4) Checking the firing point from which a competitor will shoot must be given due attention.

(a) The shooter must choose the best place to shoot from. On a bright day, for example, the position should be slightly back, to allow shooting from shadow if possible, or he must place himself to the rear of his gun kit so as to be in its shadow. Establish your position in such a way that it will not be necessary to change once the shooting begins. Shooting glasses to prevent the sun from shining into the eyes should always be used.

(b) Frequently, the surface of the firing line has bumps, slopes, and other irregularities in it. In order that there be no unevenness on the firing line to interfere with a proper position, a shooter should level his area, scraping smooth the bumps or filling in the depressions with loose dirt or gravel before shooting starts.

(5) Before arriving at the firing line a shooter must have previously inspected his clothing and shoes carefully for comfortable fit.

(6) Before your relay is called you should move your equipment to a location directly behind your firing point. Make a final check to be sure you have the proper weapon, magazines and ammunition. Blacken your sights with the carbide lamp and make sure the sight setting is correct. Clean your shooting glasses, check for a pencil, screw driver, ear plugs and stop watch. Listen to the range commands and observe the range operation. Be aware of conditions and adapt your performance to take advantage of knowing beforehand the conditions under which you will have to fire. For example: Check for rapidly spoken fire commands, evaluate the wind and light by observing the effect on previous relays, etc. As soon as you are satisfied that you are familiar with the range and range operation, you should mentally review each step you must go through in delivering a good shot.

b. Mental: At the beginning of a shooting day it is a good idea to concentrate on planning each shot as a prelude to actual firing. Experienced shooters as a rule, take into account their feelings,

energy and fitness and plan a definite method for themselves.

(1) Stimulate your confidence by developing a conviction that a controlled, uniform and exacting performance will produce good scores. Accept scores that are within your ability to hold. Confidence is a deciding factor. You will achieve a flawless performance if you are convinced you are capable of winning the match.

(2) Prior planning of your actions in the delivery of each shot will minimize the destructive effect of tension and pressure.

(3) Delay and irregularities in range operation upset some shooters. Remain relaxed and exercise patience.

(4) When you are shooting, you must think shooting, and only shooting. Be mentally alert and remove all stray thoughts from your mind. Condition your mind to concentrate on the match.

(5) Mentally review the entire shot sequence, with emphasis on how you are going to perform each act.

3. Preparation on the firing line: Having made sure that we are prepared to shoot the match, the shooter sets up his gun box and scope and makes a final check of his weapon, equipment, and of himself. (Refer to "Three Minute Preparation On The Firing Line Checklist" Figure 4-3).

   a. Check your squadding ticket and place your shooting box on the correct firing point. This eliminates the unnecessary shuffle when another competitor informs you that you are on his firing point. Make sure you are correct and let him do the walking.

   b. Set your scope on your target.

   c. Scope your target and inspect for holes. Notify range operating personnel if the target is not ready for firing.

   d. Adjust ear protectors.

   e. Load magazines with proper caliber ammunition.

   f. Make a final check of your weapon to see that the sights are still blackened. If the blacking has been rubbed off, then re-blacken at this time.

   g. Place all of your accessory shooting equipment that is located in the gun box on the shooting bench where it will be immediately available.

   h. Most top shooters use approximately three minutes to carefully check out stance, position, and grip. Simultaneously, with this checking process, the shooter should be very careful not to shorten the depth of his breathing and at the end of the preparation sequence, should breathe deeply two or three times.

4. Preparations after the command "LOAD" has been given.

   a. Upon the command to "LOAD", assume the stance, position and grip that you previously checked out to be correct. Verify this by extending the arm to check for a natural center hold and sight alignment with the target.

   b. Load your weapon: Pay particular attention to see that the magazine catch has engaged the magazine. Failure of the weapon to load, caused by the magazine being partially placed in the weapon is not a valid reason for an alibi.

   c. Keep the weapon pointed downrange.

   d. With the non-shooting hand, grasp the weapon by the barrel or slide. Recheck for a good comfortable grip on the weapon. Check the position of your trigger finger. Extend the shooting arm briefly again to check if the hold and sight alignment are naturally obtained.

   e. Check again that you are lined up on proper target.

f. Relax with the pistol muzzle touching the bench.

g. Continue the mental process, knowing that you are prepared to do the job. Mentally review the sequence of events necessary to deliver a correct shot or string. Concentrate on shot sequence. Visualize perfect sight alignment.

A checklist that can be stapled inside the lid of your gun box is recommended for use during all preparation.

ASSEMBLY AREA PREPARATION	FIRING LINE 3 MINUTE PREPARATION
(a) Check Squadding for Relay and Target (b) Have the Proper Gun & Ammunition (c) Check the Sight Settings (d) Carbide Light WITH CARBIDE (e) Blacken the Sights (f) Position Ear Plugs or Protectors (g) Oil Can - Check Lubrication (h) Screw Driver for Sight Change (i) Stop Watch for Timing (j) Scorebook BE READY for the Relay to be Called Look to the Weather Time Range Commands Concentrate on Fundamentals Rehearse Mentally	DO NOT HANDLE Weapons Until the Range Officer Gives Clearance to do so. (a) Set Up Scope ON TARGET (b) Check Target For Holes (c) Adjust Ear Plugs (d) Load Magazines (e) Recheck Magazines (f) Check Grip & Position (g) Locate All Shooting Equipment (h) Breath Control RELAX PHYSICALLY Continue Mental Processing THINK POSITIVELY Act Aggressively YOU - ARE - READY!!!

Figure 4- 3. Preparation Checklist.

5. The items that are important aids to the shooter should be present and operative prior to shooting.

a. Carbide Lamp with Carbide: This small item may be termed one of the most important accessories in the shooter's kit. But it does not work without carbide. Be sure the lamp Is ready and spare flints and carbide are on hand.

b. Magazine: Extra magazines are necessary to insure continuous operation. Be sure they are clean, operative and on hand in the gun box.

c. Ammunition: Have the correct amount and caliber of ammunition for the match being fired. Include enough for re-fires due to malfunctions, range alibis, etc.

d. Pencil and Score Book: Have a pencil or pen on hand. In some matches you will be called upon to score. Your scorebook should always be kept up to date whether in practice or in a match.

e. Ear Plugs: Protect your ears at all times from possible damage and eliminate breaks in concentration by closing out gun blast and extraneous sounds by use of ear protection.

f. Glasses with Cleaning Tissue: Colored lenses afford glare protection and are designed to let in only glare-free light. Corrective, plain or colored glasses also protect the eyes from possible damage from ejected shells, etc., and should be worn at all times when on the line. Use them to best advantage by keeping them clean. Have lens tissues In your kit.

g. Screwdriver and Tools: Sights were made to be moved. Tools that will prove useful are: cleaning rod, barrel bushing wrench, alien wrench set and screwdrivers. Be sure they are all on hand.

h. Weapons and Magazines: A properly cleaned and lubricated weapon will have much less chance of malfunctioning. Look and see If you have clean magazines for the correct weapons.

i. Squadding Tickets: It is best to rely on your squadding ticket to Inform you of your firing point and correct relay. Do not rely on memory. Keep them on your person or in your gun box at all times.

j. Stop Watch: A stop watch is an efficient means to pace your shooting during slow fire.

k. Sight Setting: Check to see if you have the sights set for the range at which this match will be fired.

l. Lubrication: Have a can of light machine oil available.

As a student of advanced pistol marksmanship, there should never arise any circumstances under which the results of your efforts are jeopardized by your failure to make complete and painstaking preparation.

B. PLAN SHOT SEQUENCE

There must be a systematic approach to obtaining shooting control. To successfully employ the fundamentals the shooter must develop a plan of action and fix it so firmly in mind that distractions do not interfere with his ability to follow a planned sequence. Simply giving yourself the order to watch the sights hold, and squeeze is not sufficient.

A shooter with natural talent may find it possible to occasionally fire good strings without having a plan of action. But regardless of his talent his performance is going to be erratic until he uses a comprehensive plan.

The shooter must realize that his ability to consistently perform well under pressure is related to the uniformity of his preparation. A planned sequence of thinking that will guide his physical actions through the complete string of fire is absolutely necessary.

You must control your mind and stop disconcerting thoughts of the possibility of failure. Picture yourself as you felt and thought while firing good strings and then ask yourself what technique you were using that enabled you to employ the fundamentals so successfully. The difference between champions and the also-rans lies in the ability to control thinking and plan actions from this point on. Prior planning of the delivery of the shot is the shooter's only insurance that the delivery will be consistently controlled. Knowledge of a successful shot sequence is the basis of the plan. The best assurance that a good performance can be duplicated is that the action follow a uniform sequence.

1. Remind yourself that when you consistently controlled your shooting you were using a shot sequence. You proved that there is a shot sequence that will work successfully for you. You must recreate precisely those same conditions to get the same results.

   The course of fire may have a successful conclusion only if the shooter in setting-up each shot, goes through all the stages - getting completely ready, planning, relaxing, and delivering the shot, analyzing and correcting in the same manner each time.

2. The following sequence is recommended for slow fire:
   a. Extend arm and breathe.
   b. Settle into a minimum arc of movement.
   c. Pick up sight alignment in the aiming area.
   d. Take up trigger slack - apply initial pressure.
   e. Hold breath.
   f. Maintain sight alignment and minimum arc of movement.
   g. Start positive trigger pressure.
   h. Concentrate point focus on front sight.
   i. Follow through. (Occurs with surprise shot only) (No reflex action)

3. The following sequence is recommended for timed and rapid:
   a. Extend shooting arm and breathe.
   b. Find sight alignment.

c. Find aiming area on edge of target frame (final deep breath).

d. Settle into minimum arc of movement.

e. Point focus of front sight (Partly release breath).

f. Take up slack - apply initial trigger pressure.

g. Maintain sight alignment (target faces).

h. Start positive trigger pressure.

i. Concentrate on sight alignment (first shot is fired).

4. When a shooter has a system to follow, he can concentrate on performance and not be worried about results. Care should be taken during early stages of instructional practice to comply with each of the items on the shooter's worksheet. As the shooter becomes more capable, sequence, analysis and corrective action becomes more important. Repetition of these steps will instill in the shooter good habits that will enable him to repeat good performance. Further, the worksheet will help the shooter form the habit of not overlooking any factor that will help his shooting. Winning scores are produced by being ready, confident, performing uniformly and being in complete control.

C. RELAXATION

1. Relaxation is best achieved by methodically bringing about a loosening of the muscular masses of the body. Think of the neck muscles, the shoulder, back, abdomen, buttocks and upper legs. Systematically reduce the tension of these members to one of support of an upright stance only.

2. A relaxed muscle does not become as tired as quickly as a tense one. It is also important to rest and relax after two or three shots during slow fire.

D. DELIVER SHOT OR STRING OF SHOTS ON TARGET

The successful delivery of an accurate shot on the target, embraces the proper employment of all the fundamentals. Do not compromise. Follow through and continue to apply all control factors. If the shot is fired as a surprise, there will be no reflex action. When you are absolutely sure you have set up conditions for a controlled shot, put your plan into action. Confidently and aggressively follow each mental step with physical action until the sequence is complete and the shot is delivered on the target.

Remember that in slow fire you do not have to shoot before bringing your gun down to rest. When you fatigue, run short of breath, experience difficulty in maintaining concentration on sight alignment or cannot maintain a suitable arc of movement, lower the weapon to the bench and relax. Re-plan the delivery of the shot, breathe deeply and try again. Some excellent slow fire shooters try two or three times before being able to deliver a controlled shot. Full control of the application of the fundamentals insures the correct control of a shot.

1. Example of a system delivering rapid fire strings with fire commands: As the Range Officer starts his commands, he will announce:

    a. "ON THE FIRING LINE, FOR YOUR FIRST STRING OF RAPID FIRE,WITH FIVE ROUNDS LOAD."

        (1) You should load at this time and assume your grip.

    b. "IS THE HE LINE READY ? "

        (1) Continue your rhythmic breathing.

        (2) Check that you are going to shoot on the proper target.

    c. "READY ON THE RIGHT. "

        (1) Extend the arm with a stiff wrist and a locked elbow.

        (2) Align the sights.

        (3) Breathe deeply and exhale.

    d. "READY ON THE LEFT. "

(1) Find the aiming area on the edge of the target frame.

(2) Take a final deep breath.

(3) Settle into a minimum arc of movement.

e. "READY ON THE FIRING LINE. "

(1) Partly release the breath and hold the remainder.

(2) Point of focus is on the front sight.

(3) Take up the slack - apply initial trigger pressure. (4) Maintain sight alignment.

f. Target faces toward shooter - commence firing.

(1) Start positive trigger pressure.

(2) Shift concentration to perfecting sight alignment.

g. First shot is fired (Surprise Shot).

(1) Maintain eye focus (follow through).

(2) Quick recovery with the sights approximately in alignment, and hold approximately in center of aiming area.

(3) Renew positive trigger pressure.

(4) Strive to correct errors in sight alignment, but do not delay positive trigger pressure.

h. Follow through with four more surprise shots.

i. Good rhythm indicates coordinated application of the fundamentals.

E. MAKE AN ANALYSIS

Complete and instantaneous shot analysis is a prerequisite for improvement in performance or score. It is a complete waste of time and ammunition to fire haphazardly without any comprehensive attempt to improve. A mental impression of the sight alignment should come at the instant the shot breaks.

It is advantageous to analyze why you are shooting well on a particular day. Some shooters have a tendency to ignore their good scores. It is important to analyze the good shot string so the combination of factors that produce these good strings can be remembered and repeated. In making the analysis, an important point to remember is to be honest with yourself and your coach. By admitting mistakes the shooter can correct them. The coach can help find a solution to mistakes which he was not aware of if you reveal everything you saw, heard or thought of during the firing of the shot or string.

If any shooter critically re-examines and analyzes his performance and his technique of shooting, he will find "minor points", which to a certain extent hinder him from improving his results. The elimination of individual shortcomings and poor methods are the method the shooter has at his disposal to increase his competitive stature.

1. Slow Fire

a. Steps:

(1) Call each shot. Base your call primarily on the relationship of the front and rear sight. Also consider any unusual occurrences in the arc of movement and whether or not concentration on sight alignment was maintained.

(2) When you have decided where your shot should be located on the target, verify your call by observation with the spotting scope.

(3) If the shot or call is good or bad, determine the cause. Generally one of the following situations will occur:

(a) Shot call and shot location coincide and you have a good shot.

(b) Shot call and shot location coincide, but shot is bad.

(c) Shot call and shot location do not coincide.

NOTE: ANY TIME YOU FAIL TO RECOGNIZE THE ERROR, YOU MUST EXAMINE YOUR PLAN TO MAKE SURE YOU HAVE NOT NEGLECTED A FUNDAMENTAL.

(4) Evaluation: Now consider the question - Did you or did you not follow the planned sequence? If your answer is yes and you had an acceptable shot, this should stimulate your confidence. Review the technique you used to deliver the successful shot. Make every effort to reestablish the same conditions that existed for the first controlled shot and repeat the sequence for each succeeding shot. If your answer was no, you must identify the specific point in your shot sequence where control was lost. The following examples cover only a few of the errors that may have occurred:

(a) Failure to establish a minimum arc of movement.

(b) Inability to maintain point focus on sight alignment.

(c) Concentration drifts from sight alignment to trigger control.

(d) Trigger pressure intermittent and uncertain with considerable effort required to fire the pistol.

(e) Lack of aggressive, determined attitude, and confidence in the technique.

b. The shooter's slow fire work sheet lists the following steps as a guide to complete shot analysis:

(1) Follow through check.

(2) Call shot (describe sight alignment).

(3) Compare target hit location with shot call.

(4) If shot or call is bad, determine cause.

(5) Watch for error pattern to form. (Same error on more than one shot)

(6) Did shot break in normal arc of movement?

(7) Did you hold too long?

(8) Did you apply positive trigger pressure?

(9) If you benched weapon on a shot effort, why?

(10) Did you lose concentration? (What did you think about other than sight alignment?)

(11) Did you get a surprise shot break?

(12) Were you worried about results?

2. Strings of Five Shots :

After each five shot string, the shooter should remember each shot as one of five individual sight alignments that enables him to accurately call the shot group. If the call and the group are not together it is necessary to determine the cause and apply positive correction. If the group is not centered then the weapon isn't zeroed, the position was bad or the grip incorrect. If the shooter is sure of the zero of his weapon, then quickly check out the position and grip before firing the next five shot string. Look for one of the five following situations to occur. (It is possible however, for two or more of the situations to occur in one string.)

a. Shots off call and grouped within ability to hold, but not centered on target.

b. Shots on call but group larger than normal holding ability and may or may not be centered on target.

c. Shots off call, group larger than holding ability and may or may not be centered on target.

d. Shots on call grouped within ability to hold, but off center on target.

e. The shooter's rapid fire worksheet lists the following steps as a guide to complete shot group analysis:

(1) Follow through the proper recovery checkout.

(2) Shot group call (describe five individual sight alignments).

(3) Compare group location with call.

(4) If shot group or call is bad, determine cause.

(5) Did you get a surprise break on each of five shots?

(6) Was the first shot fired on time?

(7) Was rhythm maintained throughout string including last shot?

(8) Did all shots break in normal arc of movement?

(9) Did you apply positive trigger pressure on each of five shots?

(10) Did you lose concentration during string? (What were you thinking of)?

(11) Did you ignore minor errors in hold?

(12) Were you worried about results?

F. POSITIVE CORRECTION (If Necessary)

1. After a shot analysis, corrective measures have to be incorporated into the shooter's performance if the error is to be avoided on the next shot. Slipshod analysis, if any, is usually compounded by the absence of corrective action. Without analysis and corrective measure, improvement is at an end. The shooter who has not learned what he is doing wrong, or what to do about it if the trouble is found is lost and will never excel.

2. Corrective measures prevent the recurrence of poor performance and must be immediately applied. Much has been written about why we shoot poorly; however, it is just as advantageous to analyze why you are shooting well on a particular day. It is more helpful to know the right way to perform than to have your mind cluttered with a multitude of "don't". Coaches in particular should concentrate on and emphasize the positive factors.

3. Look for, analyze and correct mistakes every time a shot is fired.

4. There must be agreement on corrective measures between coach and shooter. The coach must explain the reasons for specific corrective measures recommended.

G. USING ADDITIONAL AIDS TO ORGANIZE A SYSTEM OF SHOOTING

1. The sight adjustment card furnishes information on sight capabilities, aids in obtaining a zero and provides a convenient record of sight settings for all caliber weapons.

2. The preparation check sheet provides a convenient list of actions necessary to shoot successfully.

3. The pistol scorebook: The pistol scorebook is a valuable aid to the competitive pistol shooter. It is an individual shooter's record of all firing by stage, such as slow, timed, and rapid fire, plus National Match Course and the value of all shots fired should be recorded. Practice scores should be kept separate from Match Scores.

   The score book is valuable only if it is kept accurately and up to date. Record the bad scores as well as the good ones. By keeping the scorebook accurately it will be an aid in finding weak points in the shooter's performance. The scorebook will show over a period of time a trend in the shooter's progress. It will reflect progress in the different stages of fire. Averages may also be kept in the scorebook for each stage of fire. Record of ammunition used, sight adjustment, windage, and elevation, weather, light, wind, temperature, may be an aid to the shooter at a later day. There are many type scorebooks that will do the job well, but choose the one that is simple and will furnish the data you need quickly. An example of pistol scorebook page appears on the following page.

4. Due to the great number of functions necessary for the shooter to apply in exercising control of his shooting, a worksheet for both slow and rapid fire is furnished.

a. The slow fire worksheet provides the shooter with a guide to organization and application of a system for the control of a slow fire shot.

b. The timed and rapid fire worksheet provides the shooter with a guide to the organization and application of a system for the control of a five shot string of timed or rapid fire.

DATE					LOCATION							AMMO CALIBER					WIND	LIGHT			
1	2	3	4	5	6	7	8	9	10	TOTAL		1	2	3	4	5	6	7	8	9	10	TOTAL
											SL											
											TM											
ELEV			WIND			SF TOTAL					RP											
1	2	3	4	5	6	7	8	9	10			NMC TOTAL										
												TOTAL AGGREGATE										
												NMC TEAM MATCH										
ELEV			WIND			TF TOTAL						1	2	3	4	5	6	7	8	9	10	TOTAL
1	2	3	4	5	6	7	8	9	10		SL											
											TM											
											RP											
ELEV			WIND			RF TOTAL						NMC TOTAL										

Figure 4-4. Example of the Pistol Scorebook Page.

H. ORGANIZED TRAINING

The champion shooter must be capable of intense concentration and have the sheer guts and determination to adhere to the application of fundamentals in spite of match pressure, adverse weather conditions, discouragement, gun trouble and possible sickness. The best method of sustaining good performance is good organization. To shoot well, do more of the little things right. If you are well organized, overall superiority will result. The knowledge of a systematic approach to controlled shooting must be thoroughly ingrained in the minds of all shooters. The "edge" lies with the shooter with a system.

It should be added that any system will be worthless to a shooter who has indifferent attitudes toward training and who turns the training sessions into a fixed routine, repeating in robot-like fashion the prescribed shooting aspects of a competitive shooter's activity. It requires not only systematic and painstaking work, but a thoughtful analysis of his work, continuous striving for the new and better, a bold search for the best, and an unwavering strengthening of his will. Only such work on his own shooting methods will turn a shooter's training into a reliable means of assuring his further development and make it possible for him to win.

SLOW FIRE WORKSHEET

PREPARATORY (In assembly area) 1 2 3 4 5 6 7 8 9 10

1. Squadding - Proper Relay & Target
2. Using clean weapons - Proper Caliber
3. Proper sight setting (Zeroed)
4. Blacken sights
5. Ammunition, Ear Plugs & Screwdriver

PREPARATORY (On firing line)

6. Focus scope on proper target
7. Dry Fire for natural Position & Grip
8. Adjust ear plugs
9. Ammunition loaded into magazine
10. Mental Stimulation of Confidence

PLAN DELIVERY OF SHOT (Review Shot Sequence)

11. Extend arm & breathe deeply
12. Settle into minimum arc of movement
13. Pick up sight alignment in aiming area
14. Take up trigger slack - apply initial pressure (take final breath and hold part of it)
15. Maintain sight alignment and minimum arc of movement
16. Start positive trigger pressure
17. Concentrate point focus on front sight

RELAXATION

18. No unnecessary muscular tension (Relax each major portion of body)

DELIVER SHOT (Follow Plan - No Compromise)

19. Follow Through (Continue all control factors)
20. Shot fired as a surprise - No reflex action

SHOT ANALYSIS

21. Call Shot - describe sight alignment
22. Compare hit location with call
23. If shot or call is bad, determine cause
24. Watch for formation of error pattern
25. Did shot break in minimum arc of movement?
26. Hold too long?
27. Positive trigger pressure?
28. Benched weapon why?
29. Lost concentration?
30. Surprise shot break?
31. Worried about results?

POSITIVE CORRECTION (Prompt Application)

32. Include in plan of delivery of next shot.

RAPID FIRE WORKSHEET

PREPARATORY (In assembly area) 1 2 3 4

1. Squadding - Proper Relay and Target
2. Using clean weapons - Proper Caliber
3. Proper sight setting (Zeroes)
4. Blacken Sights
5. Ammunition, Ear Plugs & Screwdriver

PREPARATORY (On Firing Line)

6. Focus scope on proper target
7. Dry fire for natural position & grip
8. Adjust ear plugs
9. Ammunition loaded into magazine
10. Mental Stimulation of Confidence

PLAN DELIVERY OF STRING (Review Sequence)

11. Extend arm & breathe deeply
12. Find sight alignment
13. Find aiming area on edge of target frame (Final deep breath)
14. Settle into minimum arc of movement
15. Point focus on front sight (partly release breath)
16. Take up slack - Initial pressure
17. Maintain sight alignment & minimum arc of movement (Target faces)
18. Start positive trigger pressure
19. Concentrate on sight alignment (First shot is fired)

RELAXATION

20. No Unnecessary Muscular Tension (Relax each major portion of body)

DELIVER STRING OF FIVE SHOTS

21. Follow through and recover with good sight alignment and central hold on each shot of string

SHOT GROUP ANALYSIS

22. Group call. Describe five individual sight alignments
23. Compare group location with calls
24. If group or call is bad, determine cause
25. Surprise break on each of five shots?
26. First shot on time & rhythm maintained?
27. Did shots break in minimum arc of movement
28. Positive trigger pressure?
29. Lost concentration?
30. Ignored minor errors?
31. Worried about results?

POSITIVE CORRECTION (Prompt Application)

32. Include in plan of delivery of next five shots

AN OUTLINE SUMMARY OF THE COMPETE SEQUENCE OF FIRING ONE ACCURATE SHOT

1. Preparation: In assembly area and on firing line
    a. Physical
        (1) Personal preparation.
        (2) Limbering up. Arrive early.
        (3) Check out firing line.
            (a) Protection from wind and bright or changing sun light.
            (b) Smooth and even horizontal surface.

(4) Fit of clothing and shoes

(5) Make final check in assembly area of all necessary equipment and become aware of firing conditions both weather wise and in range operation.

(6) Move to firing line and place equipment on your firing point.

(7) Set telescope up on your target.

(8) Make final check of weapon. Check sight black. Should be Zeroed.

(9) Check for proper caliber and amount of ammunition and load magazines.

(10) Check out stance and position for natural pointing at target center.

(11) Check out grip for natural alignment of sight when incorporating all requirements of a good grip.

(12) Breathe Deeply for increased oxygen retention.

b. Mental

(1) Stimulate confidence.

(2) Think only of shooting and expel all stray thoughts.

(3) Let the coach worry about any distractions or interruptions on the firing line.

(4) Mentally review shot sequence:

(a) Think of the act of extending arm and breathing deeply.

(b) Think of how your minimum arc of movement looks and feels.

(c) Picture properly aligned sights with point focus on front sight.

(d) Decide at what point in sequence you are going to take up slack in trigger and apply initial pressure.

(e) Here you take final deep breath, exhale and hold only part of it.

(f) Remind yourself to maintain sight alignment and a minimum arc of movement while;

(g) Positive, uninterrupted trigger pressure is being applied.

(h) Concentration must shift to and remain unbroken on sight alignment while positive trigger pressure is being applied.

(i) The pistol will seem to almost fire itself because positive trigger pressure is almost involuntary.

(j) The surprise shot is now a possibility because with the employment of positive trigger pressure, the normal reaction time suffices to delay anticipatory reflexes that could disturb sight alignment, until all the continuously applied control factors can bring about the delivery of the shot on the target. This is, in effect, follow through.

2. Plan the Shot

a. Stance

(1) Stable balance.

(2) Immobility.

(3) Head position.

(4) Uniformity.

(5) Position of feet.

(6) Body erect.

(7) Shoulders level.

(8) Legs firmly straight.

(9) Hips level.

(10) Head level.

(11) Rest non-shooting arm and hand.

(12) Solid firm shooting arm and hand.

(13) Center of gravity slightly forward.

b. Natural Position Orientation.

(1) Start at 45 degree angle.

(2) Turn only head to target.

(3) Extend arm.

(4) Close eyes.

(5) Raise arm and settle.

(6) Open eyes.

(7) Shift trail foot in direction of error if necessary.

(8) Recheck.

c. Grip.

(1) Natural sight alignment.

(2) Firm to prevent shift.

(3) Unchanging tightness.

(4) Independent trigger finger.

(5) Uniformity.

(6) Comfortable.

(7) Recoil straight to rear.

(8) Avoid fatigue of hand.

d. Breath Control.

(1) Systematic.

(2) Oxygen retention.

(3) Minimize movement.

(4) Respiratory pause.

(5) Comfortable.

(6) Concentration aided.

(7) Prior to and during fire commands.

e. Sight Alignment (Relationship of Front and Rear Sights, not Sights to Target).

(1) Front sight point focus.

(2) Rear sight awareness.

(3) Exclusive concentration.

(4) 6 to 8 Seconds Duration.

(5) Coordination with other control factors.

f. Trigger Control.

(1) Positive uninterrupted trigger pressure.

(2) 2 to 5 second duration.

(3) Based on perfect sight alignment.

(4) Undisturbed sight alignment.

(5) Coordinate with optimum perception and minimum arc of movement.

g. Shot Sequence.

(1) Extend arm and breathe.

(2) Settle into minimum arc of movement.

(3) Pick up sight alignment in the aiming area.

(4) Take up trigger slack and apply initial pressure.

(5) Take final breath and hold part of it.

(6) Maintain sight alignment and minimum arc of movement.

(7) Start positive uninterrupted trigger pressure.

(8) Concentrate point of focus on front sight.

3. Relaxation

a. No unnecessary muscular tension.

b. Relax each major portion of body:

(1) Neck

(2) Shoulders

(3) Non-shooting arm

(4) Abdomen

(5) Back

(6) Buttocks

(7) Upper legs.

4. Deliver Shot

a. As planned - Do not compromise. Apply all control factors.

b. Follow through - continue to apply all control factors.

c. Shot will fire as a surprise - no reflex action.

5. Shot Analysis (Use a target center to plot shot calls)

a. Follow through check.

b. Call shot - Describe sight alignment.

c. Compare hit location with call.

d. If shot or call is bad, determine cause.

e. Watch for error pattern to form.

f. If analysis is vague or unsure, ask yourself some or all of the following questions:

(1) Did shot break in minimum arc of movement?

(2) Hold too long?

(3) Positive trigger pressure?

(4) If shot could not be fired & shooter benched weapon, what was wrong?

(5) Lost concentration

(6) Surprise shot break?

(7) Worried about results?

6. Positive Correction (If Necessary)

a. Promptly applied.

b. Agreement between coach and shooter.

c. Incorporate into plan for next shot.

Figure 4-7. The Complete Sequence of Firing an Accurate Shot

Chapter V

Technique of Slow Fire

A. GENERAL

1. A technique is the method of performing the procedures of an operation.
2. A technique of slow fire that will permit a pistol shooter to compete successfully will include:
   a. Painstaking preparation.
   b. Thorough planning.
   c. Systematic relaxation of muscular system.
   d. Intense concentration.
   e. Coordination of all the fundamental factors in delivery of an accurate shot.
   f. Analysis of shot delivery.
   g. Correction of errors.
   h. Strict uniformity of execution of the above is required to insure duplication of a good performance time after time.
3. The factors regarding the technique of slow fire shooting should not be regarded as hard and fast which demand strict execution of each point. In competitive shooting, as in any other sport, there are no established rules on technique that apply to all persons.
4. The shooter should accept the material in this chapter in a critical manner, using it as a guide in finding his own style of shooting - a style that fits his temperament, individual ability and physical construction.

B. TECHNIQUES IN SLOW FIRE CONTROL.

The best technique of control is slow fire, for each individual shooter, is the proper employment of a combination of the fundamental factors that contribute toward attaining satisfactory performance.

1. **Dry Firing Before Shooting:** A shooter should rarely shoot the first time he settles to aim. Form the habit of firing a "dry" shot or two before the first shot. This will aid in attaining the sharp, clear focus necessary for a smooth, coordinated performance. Avoid dragging out a shot which results in increasing the arc of movement and dulling of the vision. A shooter, after trying unsuccessfully for five or six seconds, should stop dry-firing, take his finger from the trigger and rest, and then make another attempt to dry fire a satisfactory shot. Do not do this too many times, however. A long day's shooting will make heavy demands on the muscles and eyes.

2. **Carefulness:** Great care is one of the mainstays of the control of slow fire shooting. Every shooter will get a certain percentage of good shots, the rest will be mediocre to poor. The poor shots result from carelessness. Accepting conditions as almost good enough is a form of carelessness. There are few top shooters who are absolutely without some compromise. The shooter who is not willing to devote himself fully and fails to pick up the tie breaking point is the one that loses the match. The principal damage that carelessness inflicts on controlled performance, strikes at the point where it can be least afforded; uniformity. For example, the failure to properly re-grip the pistol for each new attempt to shoot, violates the stipulation that if a good performance is to be repeated, you must uniformly duplicate the employment of all the fundamentals.

3. **Patience:** Patience is of great importance to the conduct of slow fire, in that without it, the shooter

may disrupt an otherwise good performance an instant from successful completion. When the conditions for a controlled, accurate shot are met, the problem facing the shooter is reduced to one of patiently allowing proposed events to follow their normal course. The synchronization of the factors in delivering an accurate shot require a certain time for completion. Any impatience that would cause one control factor to be disrupted will reduce the whole to a shambles. Improvised, desperate measures to reconstitute a lapse cannot possibly succeed. As an example, a shooter is on the firing line, making a concerted effort to maintain conditions that have been set up to control an accurate shot. His sights are aligned, the arc of movement is settling and he is positively pressing straight to the rear on the trigger, and then must momentarily wait. At this point in his technique of employing the fundamentals he will succeed or fail, depending upon his ability to allow the necessary time to pass for the smooth, undisturbed release of the hammer.

4. **Over Sighting:** A shooter must remember that his scores cannot be improved by sighting for a long time. On the contrary, "over-sighting" sharply reduces accuracy. After about ten or twelve seconds of sighting, vision becomes gradually blunted and the shooter's eye ceases to observe some minute errors. The result is a deceptive aim, and the shooter without noticing his error in sighting makes an inaccurate shot. In order to achieve the highest accuracy, sighting should be accomplished within six or eight seconds. This system of sighting is good because a shooter who does not over-sight and strain his eyes, permits them to recover rapidly and to keep their sharpness for the duration of the whole match.

5. **Establishing a System:** A system of operation must be devised by each shooter individually without which he is not capable of attaining a sustained high performance standard. Consult Chapter IV, "Establishing A System". The shooter's guide to comprehensive organization of control of a slow fire shot, "The Slow Fire Worksheet" is included in Chapter IV.

   Completing the day's schedule of shooting successfully requires the shooter to go through all the stages of shooting for every shot in exactly the same way. This is possible only if the shooter can conserve sufficient physical energy, sharpness of vision, quickness of reaction, etc. while he is shooting. The ability to repeat everything the same way requires an intelligent and economic use of ones energies.

6. **The Tempo of Shooting:** Experience has shown that the best way to shoot is to shoot each shot rapidly, within six seconds after settling. The time spent between each shot, preparing and planning, is limited only by the total time allowed for the stage of fire. All shooting should be done at a definite tempo and with a definite rhythm.

   a. In order that the shooter not only expend his energies with care, but actually build them up during the course of shooting, adequate breaks should be taken both between shots and between series of shots. It is beat to shoot at regular intervals, using all the time allotted for a particular match. In slow fire, circumstances rarely permit unbroken rhythmical shooting. Therefore, the shooter must take a particular situation and his own daily capabilities into account and shoot, sometimes at an accelerated or reduced rate, thereby operating at a tempo that will permit maximum performance.

   b. Before beginning to shoot for record, it is recommended the shooter fire "dry shots". If he feels that after the first shots that his shooting is going easily, he should proceed to shoot live ammo, making no attempt to slow down, so that the established coordination of his movements will not be upset.

   c. When a shooter finds it difficult to shoot, he should not speed up his shooting. He must re-plan, relax, wait a short time until he has the "feel" of his pistol, shoot some "dry shots", patiently reestablish control of the trigger, aim with care before each shot, and then begin shooting with assurance at a quickened tempo in order to make up for lost time.

   d. No matter how well the shooter is doing, a shooter should always be careful to control his movements at all times so as not to cause a performance failure because of negligence. There is no such thing as shooting for a long period of time without some lose of control. However, one must be constantly on guard against becoming nervous and rushing because of a bad shot, as if it is necessary to compensate in a short a time with good shooting for the poor shot. It usually happens that rushing leads to repetition of the same mistakes. Under such circumstances, analyze, correct errors, shoot without haste, and develop the next shot with more care.

   e. The regular tempo of shooting applies when a shooter is shooting under favorable conditions in

good shooting weather. If, on the other hand, the weather is not favorable, the shooter should use a different tempo and approach, depending on the conditions prevailing.

7. **Resting During the Breaks Between Shots:** During the rest period between shots, a shooter should see that uniformity in assuming body stance and positions is not destroyed. The angle at which the body is turned from the target and the relative position of the feet should not change. In order that the rest interval be most effective, it is a good idea to assume a posture which will make it possible for the muscles to relax and rebuild their strength. The best way is to put the pistol down on the table and sit down in a chair without moving the feet. You can mark the position of the feet with chalk if you are afraid the exact position of the feet cannot be duplicated. It is necessary, when shooting in gusty winds, to rest while standing, with the pistol in a slightly relaxed grip. The shooter must be prepared to assume the firing position quickly, to shoot between gusts, and during the best periods for firing.

D. COMMON POINTS OF DEFICIENCY IN CONTROL.

There are a multitude of causes for bad shots. Listed below are those most frequently found. It is not intended to be a complete list nor is it intended to provide the shooter with a convenient list of bad habits. It is, however, intended to assist the shooter in finding the source of his trouble.

1. **Jerk or Heel:** The abrupt application of pressure either with the trigger finger alone or in the case of heeling, pushing with the heel of the hand at the same time.

2. **Vacillation:** Lack of know-how and skill causes constant changing of technique. The end result is usually that you hope to get a good shot.

3. **Anxiety:** You work and work on a shot, meanwhile building up in your mind a doubt about being able to fire the shot while your control is optimum. Impatience sets in. Finally you shoot just to get rid of that particular round so you may work on others.

4. **Not Looking At the Sights:** This is listed frequently as "looking at the target". A shooter may be focusing his eye on neither the sights nor the target, but since he does not see the target in clear focus he assumes he is looking at the sights. Concentrate on sight alignment.

5. **Loss of Concentration:** The concentration will shift between sight alignment and the relative position of the sights to the target if good sight picture is the objective. Concentrate only on attaining perfect sight alignment with minimum movement and the application of positive trigger pressure comes much easier and is almost involuntary.

6. **Holding Too Long:** Adverse conditions that disturb a shooter's ability to "hold" will cause him to delay his positive application of trigger pressure while waiting for conditions to become better. The disturbing factor about this is that you will do it sometimes when you have your normal minimum arc of movement, therefore, you must try to freeze all arc of movement momentarily to get off a perfect shot quickly before any movement is resumed.

7. **Control:** Maintaining control of your shooting is a continuous battle. The battle builds tension. Tension tightens the muscles and finally the abrupt motions made in compensation for errors cause the shooter to go beyond the desired area and deliver shots in exactly the opposite place from where the error was causing him to shoot originally. Smooth coordinated actions are best assured by the relaxed, confident and carefully planned approach.

8. **Lack of Follow Through:** Follow through is the conscious attempt to keep all control factors applied through the break of the shot. For example, you are continuing to maintain concentration on sight alignment even after the shot is on the way. This is accomplished by having a surprise shot break and no reflexes of anticipation to disturb sight alignment. Follow through is not to be confused with recovery. Merely recovering from recoil and reestablishing the hold and sight alignment after the shot is fired is no indication that you are following through.

9. **Match Pressure:** (See Chapter VII - Mental Discipline) If there are 200 competitors in a match, rest assured that there are 200 shooters suffering from match pressure. You should exert all your mental energy toward planning and executing the fundamentals correctly.

E. WIND SHOOTING AND ADVERSE CONDITIONS.

In a shooting day the weather is apt to change drastically but not necessarily very often. This means that

a shooter must be able to react to all changes taking place around him and to change his method of shooting accordingly.

A shooter should also be guided by the rule that shooting should not be rushed when the weather conditions are changing frequently. He should be particularly attentive and carefully analyze any weather condition. After making a decision to shoot under a certain condition, adopt the appropriate method, and shoot only under that condition, time permitting.

1. The Wind not only causes a bullet to drift to one side while shooting, but it reduces accuracy by increasing the sway of both the shooter's body and his pistol. The shooter should try to determine a proper compensating sight change if there is a constant side wind. If there is a head wind, take care that the wind is deflected away from the eyes by shooting glasses. Powder fragments and acrid fumes blown back into the face cause smarting and watering of the eyes. Body sway can be minimized by a concerted effort to resist the wind pressure. A slight increase in general muscular tension is necessary.

    a. Wind shooting is conducive to jerking the trigger because as the arc of movement increases, the shooter develops a tendency to relax his positive trigger pressure. Usually the shooter is waiting for a more stable sight picture. His concentration on sight alignment will diminish and he will make an effort to set the shot off on the move as the sights pass the vicinity of the aiming point.

    b. The obvious answer is to first wait for a lull in the wind; next, concentrate as one normally does on sight alignment. When the smallest arc of movement that is possible to obtain under existing conditions is achieved, positive pressure is applied to the trigger.

    c. Do not continue the hold during extreme gusts. Always take advantage of a chance to rest. Each subsequent attempt to fire a shot should be made with a firm resolve to align the sights and to apply constantly increasing trigger pressure until the shot is fired.

    d. The surprise shot continues to be the indicator, even under these conditions, of whether you are applying the fundamentals correctly. Your shot group will be somewhat larger as a result of the wind disturbance increasing the arc of movement, but the wild shots resulting from faulty sight alignment, flinching, jerking and over correction will be minimized.

    e. Extensive practice under wind conditions is not recommended, but enough firing should be conducted under those conditions to familiarize the shooter with the technique and method best for him.

    f. Changing of Wind: When shooting at 50 yards and the whole air mass is moving approximately the same velocity in one direction, fairly accurate sight corrections can be made for wind. When doing this, however, it is not wise to think an all-purpose correction has been made. The changing nature of the wind must be taken into account. The grass and weeds, etc., should be watched attentively while shooting to detect a change in the force and direction. A shot should be made only when wind conditions have been accurately determined.

    g. Sometimes the necessity to shoot when the wind is gusty requires a shooter to shoot accurately in a very short time, say within two seconds. The successful firing of an accurate shot under such conditions will be achieved only if a shooter has remained in the firing position in the intervals between lulls. When shooting under such conditions, he should figure out the most advantageous posture for himself in which he can wait out the gusts of wind. As soon as there is a lull he will be able to take aim quickly and fire his shot.

    h. To aid accurate shooting when a gusty wind is blowing and when the wind is changing, a shooter must alter his tempo of shooting. Sometimes he must shoot rapidly, sometimes shooting twice when the wind is quiet or when the lighting is right, sometimes taking fairly long breaks. Wait out the unfavorable conditions for making a shot; but watch your time!

    i. In order to manage the difficulties arising during windy conditions a shooter should be prepared beforehand to change both the tempo of his shooting and alter his system of control as the situation in which he finds himself changes.

2. Adverse weather conditions such as cold, hot or rainy weather or extreme light conditions pose problems that can be solved in much the same manner as in wind shooting. Be determined to adhere to the fundamentals and ignore distractions to the competition. Compensate for disagreeable

conditions.

a. It is advisable to carry a raincoat with you at all times and possibly a plastic cover for your gun box to keep your equipment dry. Most ranges, except for those at the National Matches, have covered firing points that help to keep the competitor dry during rainy weather. A rain suit or short heavy coat are the best garments for shooting in rain or cold windy weather. The folds and loose ends of a rain coat or overcoat flapping in the wind will cause body movement.

b. During cold weather the shooter must obviously wear warm clothing. Use insulated underwear to avoid wearing many layers of heavy clothing. When the shooter becomes shivering cold it is difficult to hold the sights in perfect alignment or retain sensitive trigger control. Hand warmers are very good and are small enough to keep in the gun box or pocket. Light weight lubricating oil must be used in cold weather to prevent malfunction of weapons.

c. During hot weather, perspiration becomes a problem. A sweat band on the forehead keeps the sweat out of the eyes and it is recommended that powdered rosin be used to dry the hand. When not on the firing line the shooter should relax in the shade. Covered firing points provide protection from the sun while shooting. Salt tablets prevent heat prostration. Eat lightly.

3. Changes in light intensity and direction have a great influence on the accuracy of aiming. Under changing conditions, the eye does not perceive the relationship of the front and rear sights consistently. There may be a change in the point of impact of the shot group on the target. Experienced shooters usually settle on one lighting condition when the cloud cover is changing, aiming only when the sun is shining brightly or shooting only when the targets are in the shade. The choice of a lighting condition must be made depending on the relative length of time that the targets are well lighted or shaded.

   a. Light condition varies from extremely bright to very dim and the shooter must keep a record of the light conditions on every range he fires on in his scorebook. Some competitors are affected more by changes in light than others. A note should also be made as to how much his zero changes in these different light conditions. Sight should be blackened with care on bright days. As part of your shooting accessories, you should have both amber and green shooting glasses not only for light conditions but for protection against oil, powder fragments, fumes, wind and empty brass. Firing from an uncovered firing line usually requires different sight settings than the firing from under a shed. Ammunition should be kept out of the sun as its accuracy is affected if it is exposed to the direct rays of the sun.

   b. A shooter must also be able to complete the match rapidly in order to avoid firing under marginal conditions. The necessity for rapid shooting arises when twilight sets in. There are times on any range when a shooter must either accept an interruption during a match or shoot at a stepped up pace. For example, when the light on the target is shifting he must finish shooting before the sun's rays come through the target from the rear. This causes the target to appear blotched and makes accurate sighting and shooting difficult.

4. Our accomplishments on the firing line stem from our mental capacity to face up to the out of ordinary, and parlay these conditions into winning. Poor conditions must never become an excuse to quit or compromise. Good scores are produced by hard work in the application of the fundamentals regardless of the conditions. Proper control of the application of the fundamentals is the most important factor in shooting winning scores under adverse conditions.

F. TRAINING METHODS:

1. **Competition:** Any top shooter will agree with this word of advice: Shoot every match you can afford. The special conditions created by shoulder-to-shoulder competition can best be controlled by lessons learned in match experience. To learn how to apply this control to your slow fire technique is the result of continuous match competition.

   If numerous matches are not available, try to make your practice sessions duplicate match conditions as nearly as possible.

2. **Dry Firing**: Developing the ability to apply the fundamentals to your shooting Is a tedious, painstaking process. If all the effort is confined to range practice and competitive matches, years of hard work and great expense for ammunition are involved. The use of dry fire practice can reduce the cost in both

respects,

Dry firing develops the ability to control your shooting in all the primary factors - coordination, eyesight, arc of movement, uniformity of applying fundamentals, analysis and correction, etc. Achieving the ability to control your body in its job of delivering a good shot is one of repetition of good shooting habits. Dry firing is a definite aid in this stage of development. To got the most out of your dry firing, use the appropriate work sheet to guise your work. Prepare and plan each shot as if it were a live round. Relax when you are ready and give yourself fire commands. Deliver the shot with the same amount of effort as in live practice. Use a target center on the bench to record your shot calls. If the shot calls embraced a detectable error, analyze and determine why the errors were in your performance. You may notice errors in your performance that have been hidden in the recoil and sound of the weapon as it is fires. Precise identification of these errors can be made only during dry fire sessions. A positive correction is necessary before proceeding to the next shot. A bulls-eye, a blank wall or the open sky may be used to conduct dry firing.

Dry fire practice can be overdone. Initially, the new shooter should limit himself to ten minutes of effort. Later, as performance Improves, maximum time should be about thirty minutes.

3. **Ball and Dummy:** Ball and dummy exercise is another important aid in accelerating your improvement. It is most effective when another person loads the weapon and observes the shooter as he attempts to fire. The coach loads either a live or dummy round at random. The shooter must never know whether he has a live or dummy round in the chamber. If the shooter is disturbing the weapon with muscle reactions In any way, the coach will be able to identify the error immediately. After identifying the error pattern, the coach and the shooter must agree on a positive correction. Ideally, the correction will prevent recurrence of the error. In most cases however, the coach and shooter must be satisfied with the error occurring less frequently.

4. **Instruction in Fundamentals and Techniques Must not be Overlooked:** Every shooter must be thoroughly schooled in pistol marksmanship fundamentals. His future success will be based on how well he masters the fundamentals and the techniques of employing them.

5. **A Review of Fundamentals and Techniques must be conducted periodically.** The shooter must be reminded of the fundamental points of pistol marksmanship to assure that his shooting skill will constantly improve. Each shooter must develop a personal technique of employing the fundamentals. Improvement is at a standstill when analysis of the technique no longer identifies and removes the flaws from poor performance.

Chapter VI

Technique of Sustained Fire

Timed and rapid fire stages can be stumbling blocks, especially if attempted in a haphazard manner. However, through the development of proper techniques and careful planning, you can improve your scores and become more consistent in your performance. A recent development in the thinking of shooters is the concept of a sustained fire technique instead of the more generally accepted idea of a separate method for each of the timed fire and rapid fire stages. Many shooters that have attained national and world recognition find a distinct problem in the build-up of tension caused by the time limitation of rapid fire. It has been found that the best method is to practice the technique developed for rapid fire by employing it during the timed fire phase as well. A further advantage is gained in that should an error pattern become apparent during timed fire, the shooter has ample opportunity to take corrective action. He can then test the effectiveness of the correction before being forced to employ it under the more strenuous conditions of the ten second time limitation of rapid fire.

A. EMPLOYMENT OF THE FUNDAMENTALS.

When a shooter makes his plan on the firing line to shoot timed and rapid fire, usually a number of things have already taken place. Normally, his slow fire has already been fired and the same fundamentals used there apply to the shooting of timed and rapid fire. The planning for a string of shots is an extension of the basic factors involved in firing slow fire shots with the addition of recovery and rhythm.

1. Recovery is the return of the weapon to the original holding position in the center of the aiming area, accompanied by a natural alignment of the sights. If the shooter has a good solid stance, correct natural position, a firm grip, wrist stiff and elbow locked, the recovery is more natural and uniform. In the preliminary check out, if the weapon recovers to the right or to the left of the target center, it may be corrected by simply moving the rear foot in the direction of the error. If the sight alignment deviates, a compensating shift in grip must be made. Recovery must be accomplished as quickly as possible to allow more time for precise alignment of the sights and applying positive trigger pressure. The instant that the weapon was fired, the shooter must immediately resume the sequence of applying fundamentals for the next shot. A distinct rhythm will develop that enables him to deliver his string on the target under control and within the time allowed.

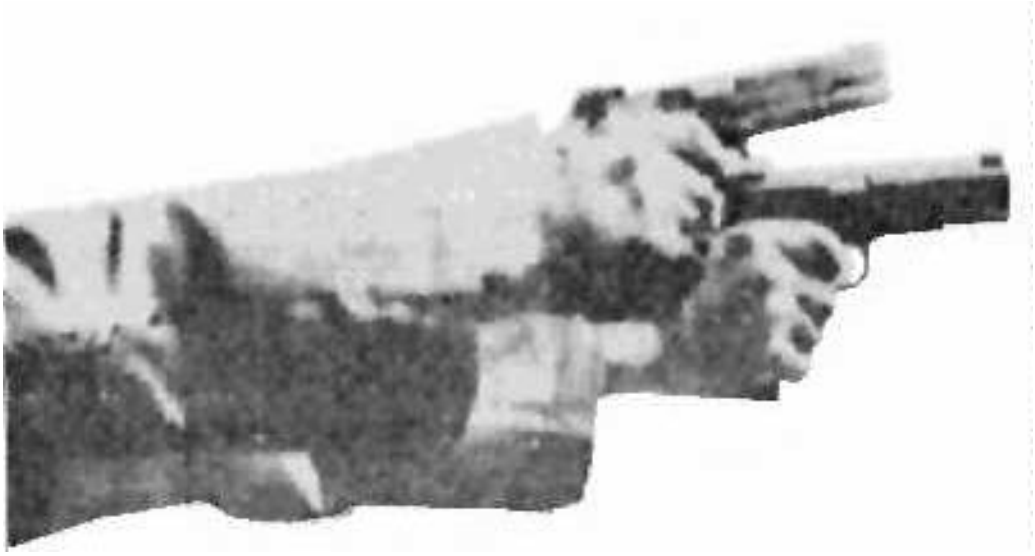


Figure 6-1. The Stance, Position, and Grip Must Be Firm Enough to Absorb the Shock of the Recoil without the Wrist or Elbow Bending.

Figure 6-2. And Correct Enough So That Your Recovery Will Return the Weapon to Your Aiming Area Quickly and Precisely With a Center Hold and a Natural Alignment of Sights.

2. Developing a good rhythm is very difficult but is absolutely necessary for good, consistent time and rapid fire. By using a uniform technique, executing a planned sequence of actions correctly and applying careful timing for each shot, we achieve good rhythm. A regular cadence indicates smooth employment of the fundamentals provided the five-shot group is centered and tightly clustered. It is particularly true during rapid fire that you do not have time to correct minor errors in hold. Any attempt to correct minor errors in hold may result in loss of rhythm. This attempted correction cause a hesitation or pause in the sequence of firing a shot while the correction is being made and results in a speed-up of trigger pressure for the remaining shots of the string. The lack of rhythm causes more bad rapid fire strings than any other factor. The first shot must be fired within one second after the target turns in rapid fire. A common error is to try to attain a perfect sight picture in an effort to make the first shot an X thereby losing valuable time in getting the string started. When this happens, usually the shooter becomes worried about the time, loses his concentration, speeds up his deliver rate for the remaining shots of the string and as a result has poor rhythm and a bad string. Another common error is to shoot the first four rounds with good rhythm then knowing there is a lot of time left, hesitate and try to set up a perfect sight picture so as to shoot an X on the last shot. Usually this last shot will be bad because the shooter does not apply trigger pressure properly. He invariably becomes worried about the time, loses his concentration and forces the shot to fire. In doing so he disturbs the sight alignment by either jerking the trigger or heeling the shot. In timed and rapid fire, a rhythm or

cadence of firing must be acquired. This rhythm is needed for coordination and also for assuring the shooter, in a subconscious manner, that an equal amount of time is being allotted for each shot, and that he is abreast of the time schedule. Any mechanical operation has a certain rhythm. Timed and rapid fire is definitely a mechanical operation.

B. TECHNIQUE OF SUSTAINED FIRE.

The shooter must employ a technique tailored to give him the ability to control the employment of the fundamentals under all conditions of competitive stress. The shooter must consider the following known factors which have a bearing on the control of a five-shot string of timed or rapid fire.

1. Find your aiming area on the edge of the target frame. Look directly at the faced target with your head in shooting position. Determine precisely where your aiming area is going to be when the target turns away. Relate this area to a spot on the edge of the frame that will be nearest you when the targets are edged. The time limitation precludes the luxury of looking at the target as it turns toward you so you can adjust your hold before applying positive trigger pressure for the first shot.

2. Stiffen your shooting arm as it extends the weapon toward the target and settles into the aiming area. Remember the degree of muscle tension required to give you solid arm control and a minimum arc of movement.

3. You should look at the aiming area and relate it to a spot on the edge of the target frame as you settle into a minimum arc of movement. Then shift the point of focus back to the rear sight before making a final point of focus on the front sight. This system is used to make absolutely sure the eyes are not focused somewhere between the front sight and the target.

4. The shooter must never forget that once he attains final focus on the front sight he never again allows a focus shift until all five shots of the string have been fired. To look at the target at any time during the string is inviting disaster. Trust your stance, position and grip to give your precise recovery and to maintain a minimum arc of movement within your aiming area.

5. In rapid fire, the first shot should break soon after the target turns. It is not necessary to try to get the first shot to break while the target is turning but it should break within one second. It is advisable to use the first motion of the target as the signal to apply positive, steadily increasing pressure on the trigger. The target's turning may sometimes produce a feeling of surprise and is accompanied by a momentary hesitation. This can cause a break in the shooter's composure and the firing of the first shot is delayed. By assuming a more determined attitude and stimulating your competitive aggressiveness you can overcome this problem. We suggest this approach: "When that target moves I am going to punch the 10 ring full of holes." You will be surprised at the effect this action has of eliminating any remaining doubts and at the resulting surge of confidence that it incurs.

6. During recovery, reestablish sight alignment without a focus shift. This action is important because a focus shift during recovery will delay the reestablishment of sight alignment. Approximately one-half second is needed between shots for this ill-advised operation and could total two full seconds of lost time. Successful rapid fire requires the use of ten full seconds for proper coordination and full control.

7. If you allow your eyes to follow the pistol during recoil, you may inadvertently move your head out of its original position. Any head movement during firing will disrupt the relationship between the aiming eye and the front and rear sight alignment. Correction will require a wrist movement which only artificially corrects the error. Upon recovery from recoil of the succeeding shot, the same error is once again apparent and likewise needs correction.

8. Reaffirm your determination to concentrate upon sight alignment the instant positive trigger pressure is resumed. Maintain your concentration on sight alignment until the pistol fires again.

9. After the pistol fires it will be moved out of the normal hold area by the recoil of firing, and it must be recovered instantly to the position it occupied prior to the dislocating effects of recoil. Recovery must be natural, uniform and quick.

10. You must immediately reestablish a positive, steadily increasing pressure upon the trigger. This should occur shortly before recovery is complete and the minimum arc of movement reestablished. The increasing pressure should neither be stopped nor varied in rate until the weapon has again been discharged. As soon as the positive, constantly increasing trigger pressure has been reapplied, shift

your attention from thoughts of trigger control to the problem of sight alignment, just as you did on the first shot of the string.

11. The sights will be in near perfect alignment at the end of recovery, if the grip, control and head position are maintained. However, this ideal situation occurs only intermittently.

12. Remind yourself that this technique, repeated for each shot, insures that continuity is established from one shot to the next. Assure yourself that you can deliver a successful string on the target with an absolute minimum of wasted thought and time by following this system.

C. COMMON DEFICIENCIES IN CONTROL:

A number of deficiencies peculiar to timed and rapid fire are:

1. Follow through, applies to slow, timed and rapid fire and should not be confused with recovery. Follow through is the attempt by the shooter to keep everything exactly as it was set up until after the round is on its way to the target. Lack of follow through is a breakdown of one or more of the factors set up by the shooter to control a good shot. For example, lack of follow through might be caused by a speed up of trigger pressure resulting in anticipation of recoil and a heeled shot at one o'clock.

2. Recovery must be made quickly to allow time for aligning sights and positive trigger pressure. Recovering too slowly takes up excess time, alters the shooter's rhythm, and when he realizes that he has very little time left causes him to speed up his delivery rate. Each shot of a five shot string must be fired individually and uniformly, each one treated as a single shot. The shooter must see five distinct sight alignments.

3. Grip: An incorrect grip will cause misalignment of the sights on recovery after each round is fired. This is corrected by carefully shifting the grip before the next string. Any tilting or turning movement of the head from its normal level position will cause the weapon to appear to recover either to the right or left of the bull's eye. Both of these errors may cause a delay in firing on the shooter's part in an effort to correct them, or break his concentration on sight alignment, losing valuable time and causing a loss of rhythm. All these factors add up to a poor string of five shots. Check out and dry fire the position and grip during the three minute preparation period just prior to the range officer's command "LOAD".

4. Calling The Shot Group: Many shooters fail to remember each shot on the basis of five individual sight alignments and cannot call the shot group accurately. If the shot group call is made and the call and the group are not together, it is necessary to determine the case and apply positive correction. The weapon probably is not zeroed, the position was bad or the grip incorrect. If the shooter is sure of the zero of his weapon, then dry fire the position and grip before firing the next five shot string.

5. Rhythm is absolutely essential. A common error in sustained fire is trying to make the first shot an X and thereby losing valuable time in getting the string started. When this happens, the shooter usually has poor rhythm and a bad string. When a determined shooter causes the first shot to be fired on time, this same determination brings about a continuous application of the fundamentals that assures a rate of fire that will complete the string on time.

6. In shooting rapid fire the shooter does not have time to correct minor errors in hold. Trigger pressure is applied on the basis of sight alignment and not sight picture. The shooter should make every effort to keep his arc of movement at a minimum, continue positive trigger pressure, maintaining sight alignment, and shoot with a definite rhythm.

7. Lack of A System: When a shooter has a system to follow it relieves his mind so that he can concentrate on performance. Care should be taken during the early stages of instructional practice to comply with each of the items on the worksheets. As the shooter becomes more capable, only the key items of preparation, shot sequence, shot analysis and positive correction are relevant. Methodical repetition of these essential steps will instill in the shooter good shooting habits that will enable him to repeat a good shooting performance. Further, the rapid fire worksheet will help the shooter form the habit of not overlooking any factor that will help his shooting.

8. Complete and instantaneous shot analysis is a mandatory prerequisite for any improvement in your performance or scores. A mental impression of each sight alignment should come at the instant the shot breaks. Corrective measures to prevent the recurrence of a poor performance must be

immediately applied. Much has been written about why we shoot poorly; however, be reminded that it is just as advantageous to analyze why you are shooting well on a particular day. It is more helpful to know the right way to perform than to have your mind cluttered with a multitude of "don'ts ". Coaches in particular should concentrate on and emphasize the positive factors.

9. Overeating during the shooting day has lowered may aggregates. The delicate edge that a shooter attains before a match can be completely shattered by one hearty repast. The minimum arc of movement is greatly increased by the pulsations of a heartbeat imprisoned between an overloaded stomach and a suet incased ribcage.

10. Inability to control mental processes indicates a fear of failure or lack of motivation to do your best. The shooter must develop more effective method of stimulating confidence. Review the reasons why you are here as a shooter. You came to win the match. Encourage your competitive instincts by setting a goal as high as you can possibly reach.

11. The shooter's concentration breaks as target turns. More attention is required in developing a determined attitude and mental alertness. Review the system you use in starting positive trigger pressure and maintaining point of focus on front sight. Apply any correction needed. Remove all doubts as to the location of the center of the aiming area of the target in relation to the edge of the target frame during the preparation stage.

D. TRAINING METHODS.

1. Frequent shoulder-to-shoulder competition and regularly scheduled record practice on the firing range is the most effective method of accelerating your development as a top competitive shooter.

2. To be most effective, each practice session must have a goal. You should approach the training period with the idea that you are going to distinctly improve one aspect of your shooting technique and at the same time continue the general improvement of your ability to employ the fundamentals more effectively.

3. To improve your ability to deliver your first shot quickly and accurately, we advise a practice session of about ten rounds delivered in the following manner. Adjust the target turning mechanism to face the target and turn it away after one and one-half seconds. Use your normal preliminary preparation with maximum attention on delivering the first shot without hesitation as the target turns. Fire one shot only. Repeat the exercise ten times with sufficient time between shots to allow for mental reorganization and preparation. Fire two, fire-shot strings with the proper 10 second interval to establish your rhythm and then shoot a rapid fire, 20 shot match for record practice.

4. To improve your ability to achieve rhythm and maintain a point focus on the front sight, place a target on the frame backwards so that no bull's-eye or aiming point is visible. Assume your stance, position and grip with meticulous attention to detail. Without a point to aim at, you will find that you must trust your stance and position to maintain an acceptable arc of movement in the center of the aiming area on the blank target. You will find it easier to apply the fundamentals and discover that you can deliver the string with amazing accuracy. Rhythm and sight alignment can be maintained with a startling degree of control. This is because the distracting effects of having an exact point of aim has been eliminated. You have no way of knowing when a perfect hold occurs. A perfect sight picture is not necessary. You simply accept minor errors in hold caused by your minimum arc of movement and go ahead and follow your plan of delivery of each shot. After firing on the blank center you should immediately go into a rapid fire stage of fire with a normal target for record practice.

5. Avoid training and shooting alone. Use a training program that duplicates as near as possible the competitive atmosphere of a match. Develop and use a comprehensive plan that improves your ability to employ the fundamentals reliably under pressure and continuously strive for improvement.

6. Dry firing practice should be conducted with the same careful attention to detail as live ammunition practice. The shooter's rapid fire worksheet (para C, "Establish a System"), this Chapter, is a guide to perfecting your system of shooting control.

7. Improvement of recovery must be approached from two angles: Reestablish a hold in the center of the aiming area, and realignment of the front and rear sights in perfect relationship. Practice and re-practice assuming a proper position that furnishes the shooter with a natural hold that points the shooting arm and weapon at the center of the aiming area. Get a proper grip and head position that

gives the shooter a natural sight alignment. Quick recovery is essential. For example, with a 2 second interval to deliver a rapid fire shot, there should not be more than 1/2 to 1 full second devoted to recoil and recovery. At least 1 second of the interval must be used to dress up sight alignment while settling into a minimum arc of movement. The simultaneous application of positive trigger pressure may be delayed if either factor, hold or sight alignment, is imperfect.

E. WIND SHOOTING AND ADVERSE CONDITIONS:

During timed and rapid fire, the shooter has to fire when the commands are given, wind or no wind. The means of overcoming this disturbing handicap are found in strenuous application of the fundamentals. Usually these efforts attain less positive results because the shooter cannot maintain his normal, minimum arc of movement in the wind. Concentration on sight alignment regardless of movement caused by wind will result in groups only slightly larger than those fired under ideal conditions.

1. During Wind Shooting: As the arc of movement increases during wind shooting, the shooter develops a tendency to relax his trigger pressure. He is waiting for a more stable sight picture. His concentration on sight alignment will diminish and he will make an effort to fire as the sights pass the vicinity of the target center. The obvious answer is to concentrate on sight alignment and maintain as small an arc of movement as possible and to start a constantly increasing pressure on the trigger until all shots are fired. Each attempt to fire a string of shots should be made with a firm resolve to align the sights for each shot and to apply increasing trigger pressure in spite of the increased arc of movement due to the wind. Your shot group will be larger, as a result of the increased arc of movement, but the wild shots resulting from faulty sight alignment, flinching, jerking and over-correction will be minimized.

    a. Rhythm must be maintained, with the uncompromising determination not to hesitate in applying positive trigger pressure despite the abnormal movement of the shooting arm.

    b. Extensive practice under windy conditions is not recommended but enough firing should be conducted under windy conditions to prevent a stampede to the nearest wind shelter when a wisp of air movement stirs the pine tops.

    c. The shooter should not place too much reliance on indications of flags high above the line of targets and the firing line. In addition, do not accept the indications of flags flying at the edge of a forest, steep precipice, ravine, or depressions, since the wind speed, at various levels of the atmosphere and terrain are different. It is necessary to be guided by the indications of high grass, tall weeds, strips of paper, etc. in the vicinity, which are nearer the level of the weapon-target line.

    d. It should also be kept in mind that wind can blow around terrain irregularities and create all kinds of turbulence. If flags were set up along the entire length of the range, they often would indicate a different, even opposite, wind direction. For this reason, the shooter should not always rely on one indication at the line of targets. Determine wind direction and intensity for the entire length of the range, by carefully observing the motion of grass and bushes located between the firing line and the target.

    e. With time, the shooter will develop a subconscious feeling and acquire experience that enables him to become rapidly oriented to wind conditions and to make the necessary corrections for carrying out accurate fire under adverse conditions.

2. Adverse weather conditions such as cold, hot or rainy weather or extreme light conditions pose problems that can be solved in the same manner as in wind shooting. Be determined to adhere the fundamentals and ignore the distraction of adverse weather.

    a. It is advisable to carry a raincoat with you at all times and a plastic cover for your gun box to keep your equipment dry. Most ranges have covered firing points that help to keep the competitors dry during rainy weather.

    b. During cold weather the shooter must obviously wear warm clothing to include insulated underwear. When the shooter becomes shivering cold it is difficult to hold the sights in perfect alignment, or retain sensitive trigger control. Hand warmers are very good and are small enough to keep in the gun box or pocket. Light weight lubricating oil must be used in cold weather to prevent malfunction of weapons.

c. During hot weather perspiration becomes a problem. A sweat band on the forehead keeps sweat out of the eyes and it is recommended that powdered rosin be used to dry the hands. When not on the firing line the shooter should relax in the shade. Here again covered firing points provide protection from the sun while shooting. Salt tablets prevent heat prostration. Eat lightly.

d. Effect of temperature on the shot dispersion:

(1) The lower the air temperature, the greater the air density. A bullet traveling in denser air encounters a larger number of air particles, with the result that it loses its initial velocity rapidly. Therefore, when shooting in cold weather, the bullet velocity decreases somewhat and the center of impact moves downward slightly.

(2) In firing a large number of rounds for an extensive period of time, when the pistol barrel becomes hot, the shooter should not permit a round to remain in the chamber too long. The relatively high temperature of the barrel is transferred to the propellant by means of the cartridge case, and can lead to a change in center of impact and to high shots, depending upon the length of time the round remains in the hot chamber.

3. Light varies from extremely bright to very dim and the shooter must keep a record of light conditions on every range fired on in his score book. Some competitors are affected more by changes in light than others. A note should be made as to how much his zero changes in the different light conditions. Sights should be blackened with care on bright days. As a part of the shooting accessories, you should have both amber and green shooting glasses not only for light conditions but for protection against oil, wind and empty brass. Firing from an uncovered firing line usually requires different sight settings than the firing from under a shed. Ammunition should be kept out of the sun as its accuracy is affected if it is exposed to the direct rays of the sun.

4. The major portion of our accomplishments on the firing line stems from our mental capacity to face up to the out of the ordinary and parlay these conditions into a winning margin. Poor conditions must never become an excuse for expending less effort and consequently a poor performance. Good scores are produced by hard work in the application of the fundamentals regardless of the conditions. Proper application of the fundamentals is the most important factor in shooting winning scores under adverse conditions.

Chapter VII

Mental Discipline

A. PURPOSE:

The purpose of this chapter is to acquaint you with the need for and the method of controlling your mental and emotional processes and extending your span of mental concentration while under conditions of competitive stress.

B. GENERAL:

Mental discipline is the broad term used in describing the shooter's actions and reactions when facing competitive pressure. A distinguishing feature of successful competitive shooting is that it is associated with overcoming obstacles and difficulties which require the utmost exertion of a person's mental capacity. The ability to keep control of oneself to force oneself to overcome difficulties, and to maintain presence of mind in any difficult situation is a necessary human quality. Without this quality, you will not shoot high scores in a match. To sustain mental discipline, you must have high moral qualities, a sense of duty and responsibility to the team and a sense of honor. These traits are the source of the will to win. In moments of crisis, they help you to mobilize all your resources for victory. No person is born with these qualities. They are partly developed in the course of the shooter's life and the activities of daily living. Good marksmanship training will solidify these traits and develop the minds ability to control mental processes.

C. ESSENTIAL TO MARKSMANSHIP

1. Mental control is essential to marksmanship. Mastery of the physical skills alone does not provide the control of performance necessary to compete at the highest level. Emphasis must be placed on how and what to think. The capacity for intense concentration will provide for exacting control. Coordination of the essential factors is necessary for the delivery of an accurate shot on the target.

2. Mental discipline provides the control you must have xx of your mental faculties to maintain confidence, positive thinking, and sustain the ability to duplicate a successful performance. Mental discipline will help to avoid overconfidence, pessimism and withstand conditions that disrupt mental tranquility. It also provides the emotional stability necessary for the development of a champion shooter and confidence in his ability to successfully employ the basic skills of marksmanship for a dependable performance under all types of stress.

D. DEVELOPING MENTAL DISCIPLINE AND CONFIDENCE:

The continuously repeated, successful execution of a completely planned shot results in the gradual development of mental discipline. If your mental discipline has developed sufficient force you will be able to control your thoughts and exercise unhampered mental concentration. Also, your preparations and shooting routines will always be the same.

1. Response to a problem: Psychologists have determined that there are four basic methods of responding to a problem. Two methods are positive and classified as direct or indirect. Two methods are negative, classified as retreat and evasion.

    a. Positive Response.

        (1) The direct, positive approach. This is the self-confident, self-sufficient, direct, positive attack. You realistically face the facts, analyze them, identify and evaluate the obstacles to a

successful solution. You know what you want to accomplish and you take direct steps to attain it.

(2) The indirect, substitute or compromise approach. This is characterized by small diffident, tentative, indirect action. Sidestepping leads to seeking shortcuts. When the probable solution is tried, there is much fervent hoping that the fates are on your side. You are only hinting and probing instead of establishing definitely what you need to do. There is only a minimum of positive effort here.

b. Negative response.

(1) The negative retreat: The failure to give the honest try to see what you are capable of accomplishing. Surrendering without a sincere effort. The flight habit can become chronic. This is the man that cannot accept the responsibility for a mistake or failure. A bad shot produces excuses.

(2) Evading the issue: Evasion is the lack of incentive. Why? Is the approach. Why do I have to do better then anyone else? If the desire to excel is not there, you will never aimlessly or otherwise achieve the degree of accomplishment that crowns the champion.

2. Analyze the problem.

a. Psychologists have discovered that one of the chief reasons for difficulty in the solution of problems is inability to soundly analyze. Pose a clear-cut plan of action in full array. Face the specific difficulty and make a determined effort to break it down. If it can be identified there is a solution for it. There are shooters on your team or some other team that are operating without this specific problem putting a brake on their performance. Talk it out. A communal pondering session will break it wide open,

b. There is a four-point system of analyzing and solving specific problems. It reduces the whole big problem to four small ones: "STEPS IN THE PLANNING"; " SPECIFIC DIFFICULTIES"; "SUCCESSFUL SOLUTIONS"; "DOUBTFUL OR NO WORKABLE SOLUTION". Weigh your "specific difficulties" and "doubtful solutions" and start an improvement campaign to resolve each area of deficiency.

3. Confidence. Confidence results from repeatedly bringing under control all the factors that create conditions for firing an accurate shot. An accurate shot is one that hits the center of the target. You must have confidence to shoot well. Confidence in what? How do you get it? How do we keep it once it is obtained?

a. You must have confidence in the fundamentals. You must be convinced that if you control their employment correctly, you will achieve excellent results.

b. You must also have confidence in your ability to execute the proven fundamentals correctly. You will have proven your ability to do this in your practice sessions.

c. Think big! Think positive! "I will do it", and you will succeed. However as soon as you admit the slightest possibility of failure, your chance of success is questionable,

d. It has been said that a shooter must have an open mind, implying that we must have the ability to accept new ideas. What we should also strive for is a mind that is open to positive thoughts and completely closed to negative thoughts. You have heard so many times "Don't jerk that trigger". True as this axiom may be, it is of no advantage to have this thought enter your mind when you are trying to get off a shot. It is negative, it implies failure. Such thinking continually occupies your mind with something you don't want to do, rather than something you should do. Would it not be more advantageous to think, "I must follow through, for when I do this, I will get an "X"". This is the positive side of the picture, it implies success. It gives you something that you should do rather than something you should not do. What the shooter needs is a mind full of positive "do's" and "wills". There is no room or necessity for those distracting "don'ts" and can'ts". However, just thinking positively is not enough; we still must have definite ideas of how we are going to employ positive thoughts. There is no room for vagueness or vacillation in our technique of shooting.

e. A confident attitude adversely affects your competitors. A match is generally conceded to a small number of confident individuals who expect to win. Confidence is contagious and favorably

affects your teammates. Smile. Give no comfort to your competition by revealing by word or by act that anything is wrong that might affect your chances of winning the match.

4. Channeled mental effort resists the tendency of the mind to drift during the period when intense concentration on the relationship of the front and rear sights is essential.

   a. Channel mental effort relentlessly toward the final act.

   b. Complete exclusion of extraneous thoughts for a brief period (three to six seconds) is necessary for controlled delivery of the shot.

   c. Prior planning of the sequence of action gradually enables the shooters to sustain concentration for a longer period.

   d. Coordination of thought and action is the result of experience obtained through extensive practice and match shooting where the same satisfactory plan of action is followed repeatedly. Precise coordination is absolutely necessary in controlling the delivery of each shot during the entire match. Split second coordination and timing are maintained by frequent practice. When the practice time is insufficient, do not be overconfident and expect to be able to sustain coordination through prolonged match shooting conditions.

E. WHY CAN'T YOU BE A WINNER? (THE DANGER OF NEGATIVE THINKING.)

1. Who won the last match in which you participated? If you did not win, what was the reason?

   Why is it so difficult to shoot championship scores? It is not that most of us have not been taught the fundamentals of shooting, the fault usually lies in that we open our minds up to thousands of negative reasons why we cannot shoot good scores.

   The following is a discussion of each of the reasons that bring about a poor performance, and what can be done about them:

   a. When the weather is bad, it is simple to say "It is raining, snowing, the wind is blowing. All my scores are going to be bad. ". This may be a true assumption. You can follow this vein of thought throughout the match and you probably will continue to shoot just average scores as compared to your competitors.

      Why not think and convince your self that good winning scores have and will be fired under the same bad conditions. Positive application of the fundamentals has produced good results in spite of the numerous difficulties. If your thoughts are directed strongly enough towards planning and executing a controlled performance, you will not have time to worry about the weather.

   b. Don't "Sunday - morning - quarter back" the operation of the range. Convince yourself that, "As long as there is a target to shoot at and I have the proper amount of time to shoot, I will shoot good scores."

   c. Have you asked yourself, "why must I shoot exceptional scores ? ". The answer to this question will vary with each shooter. You must be motivated to constantly improve your performance. One of the most common excuses for not trying your best is because there is no challenging competition. A tendency to accept a passable score in a match becomes a habit. You tolerate an average performance without becoming alarmed. Regardless of the competitive ability present, you must employ the fundamentals to the utmost of your ability. You must retain not only the desire to win, but strive to set new records at all times. Failure to accept the challenge will cause a decline into the habit of treating your shooting as a daily task instead of a challenging adventure.

   d. The main components necessary to shoot championship scores are an accurate gun, good ammunition, an individual with the ability (physical and mental) and the desire to be a champion. Therefore every time you let the thought of inferior equipment enter your mind, STOP! Think: "This gun and ammunition will shoot possibles if I control it. "

   e. The potential winner is always thinking about applying his plan of action and not about how he is going to beat you. He knows that most of the other competitors are beating themselves with their own uncontrolled thoughts. You can be one step ahead of all your competitors by directing your

mental effort toward your plan of controlling each shot.

f. There is a first time for winning in shooting as in everything else. A first time for a national champion to be beaten, and a first time for you to become a national champion. If you want to win all the marbles, you can. The best way is to believe you are as qualified to win as anyone else. Make up your mind that you are going to shoot your next tournament as one big match. Let the individual stages and gun aggregates take care of themselves. A good performance on each individual shot is now your aim.

g. Carelessness is a state of mind that overwhelms an individual who is aimless and hap hazard in his approach to a challenging task. Organization of all the factors having a bearing on the task will in most instances assure that the action will be successfully executed.

h. Overconfidence dulls your normal responses. You ignore or are unconscious of the development of unfavorable conditions. False assurance can upset the sensitive balance on which your performance depends. Do not relax your determination to work hard even if competition is not keen. Strive to reach a happy medium between overconfidence and pessimism.

i. Pessimism detracts from your ability to concentrate. Anxiety over possible failure undermines the ability to control the shot. Impatience and uncontrolled actions are the results. A negative approach hampers the repetition of a uniform, satisfactory performance.

j. Avoid distracting conditions which you know will upset you. Avoid emotional upset such as anger, worry, giving up under adverse conditions or after unsatisfactory shots, ignore boasts, rumors, misinformation, and snide remarks. Avoid adding up individual shots as the buildup to the final scores.

F. MATCH PRESSURE:

If you think that you and you alone have the problem of match pressure, look around - we all have it. The man who has never experienced match pressure has never been in a position to win a match. What is the difference? What is the dividing line between champion and plinker? Both may shoot comparable scores in practice, yet one is invariably at the top of the list and the other at the bottom. The dividing line is clear and obvious; the ability or lack of ability to control their thinking. Mental discipline. Some have learned to control their emotions and anxieties and go right ahead and perform within their capabilities. Others, even with years of experience, pressure themselves out of the competition every time they step up to the firing line.

1. First, in the treatment of match pressure, we must find what causes it. Without knowing the reasons, we can never combat it. Match pressure is simply a condition created by suspense, and the uncertainty and anxiety which generally accompanies suspense. For example, it is easy for the relatively inexperienced competitor to feel suspense building up as he finds himself amassing a superior score; or for even the experienced competitor to feel, as he nears the finish of a match, knowing he can win. This is when worry and fear creeps in and, unless controlled, the resultant tension will undermine efforts for maximum performance.

2. The main thing that will help a shooter under these conditions is experience. Long hours of practice in working on his shortcomings and tournament participation against the best competition will serve to gradually calm our emotions and anxieties when under stress. The champions, in spite of their nervousness in match competition, mobilize all their energies and resources and on occasion, do even better in a match than in practice.

   The emotional and physical upsets of competitive stress are experienced differently by different persons. The condition varies for every shooter both in its character and in its intensity. However, regardless of experience or ability to exercise self-discipline, shooters are to some degree nervous in competition. The better you are trained, the more confidence you will have. If you have trained under conditions approximating match conditions and have participated in many tournaments in the past, you will be less nervous. At the beginning of a shooting season, even with experience, you may be somewhat nervous. It is important that you must not remain passive to these disturbances. Do not let yourself become a victim of your emotions. Resist stubbornly and force yourself to shoot to win. If you feel that nervousness in competition is unknown to you, you may be indifferent to the best interests of the group. You may lack an elementary understanding of pride in doing a job well. You are showing indifference to one of the strongest, natural excitements which present a challenge to the human

animal. When anxious, you add to your distress when you feel that everyone is watching you. Yet with all this, our counterpart, the Champion, appears to be calm and enjoying himself. Let's face it, he is!

3. How do you control match pressure? First, realize that it can be controlled and actually used to your advantage. Individuals have learned to control their shooting to the extent that their match and practice scores don't vary appreciably.

    a. Prior mental determination. This is the most helpful factor that is available to you. By thinking through the correct procedure for firing each shot, just before you shoot, you can virtually eliminate distraction. If you fail to do this and approach the shot without a preconceived plan of attack, your results at best will be erratic.

    b. Channel your thinking to the more important fundamentals. You must continually think fundamentals and review them in your mind. Train yourself so that as many of these fundamentals as possible are executed automatically without tedious effort on your part. When you do this, you have only the most difficult fundamentals to contend with in the actual firing. This will enable you to direct all of your mental and physical efforts toward keeping your eyes focused on the front sight and following through.

    c. Establish a Routine: Keep from becoming excited. In establishing a routine, you eliminate the possibility of forgetting some trivial item of preparation or technique that may throw you off balance.

    d. Work on each shot individually. Each shot must be treated as an individual task. There is no reason to believe that because your first shot was bad, your next one will be the same. Nor is it logical that if your first three shots were good, you have a guarantee that those to follow will also be good. Each one is merely a representation of your ability to apply the fundamentals. Your performance will vary if you let it.

    e. Relax your mind. Right from the time you get up in the morning. Nothing will put you in a greater state of mental agitation than to have to rush through breakfast and rush to make your relay. If this happens, your score is ruined at about the third red light you hit. Take it easy. Shooting is fun, enjoy it.

    f. Practice Tranquility. Are you the guy that loses his temper every time he has a bad shot? With whom are you mad? You are doing nothing more than admonishing yourself for your vacillation in the execution of a shot. If you had worked a little harder on applying the control factors, the shot would have been better. On the other hand if you do everything within your power to make the shot good and for some reason or other it is not good, you should have no cause for undue irritation. Although you must exert all of your mental and physical ability toward shooting a good score, infrequently you will fail to do this. Needless to say that when this happens, if you chastise yourself severely, or fall into a fit of depression because of poor score, you will hurt your performance for the rest of the match. It is not intended that you laugh off or treat lightly a poor performance; however, you must possess the presence of mind to accept the bitter with the sweet. Preparing, planning, relaxing and care in delivering the shot with careful analysis and positive corrective measures, is the cycle of action you must force yourself to conform to. You can then be assured that the next shot will be delivered under the most precise control you are capable of exerting.

    g. Match Experience. Without question, competitive experience is one of the ingredients necessary to an accomplished competitor. However, experience alone is of limited value. You must flavor experience with an accurate and honest evaluation of performance. You must strive for increasing mental control. It is often left out of training until the physical ability to shoot far exceeds the ability to exercise mental control.

    h. Argue with your Subconscious. Not only argue with it but win the argument. Even as you are reading this you are hearing that little voice in the back of your mind that keeps saying "Yes, this sort of thing may work for Joe, but I know damn well I am going to goof the next time I get close to a winning score.". Whose voice is this? Where did all these ideas come from in the first place? Where did this little guy get all his knowledge? Let us be realistic. Your conscious mind puts these ideas into your subconscious, so don't ever believe that you can not over power it. It is not easy. He has been saying what he pleased for years and now he isn't to be routed easily. But

don't give in to him and eventually you will find that the subconscious mind is not in conflict with your conscious efforts "don'ts. "

k. With all of this emphasis on the positive approach you are now going to get two big "don'ts".

(1) Don't expect spectacular results the first time you try mental discipline. There is coordination of employment of the fundamentals to be mastered. If you find that you exercise satisfactory control only for a short period of time, work on extending this period by practicing and perfecting your system. Remember that your returns are in proportion to your investment.

(2) Don't use alcohol and drugs. One or both of these may control some of the symptoms brought about by match pressure. However, in doing so they incapacitate you in other ways that will prevent good performance.

G. REDUCING TENSION AND ATTAINING RELAXATION

1. Types of Tension:

a. Normal tension is the prevailing condition of any organism when it is mustering its strength to cope with a difficult situation. All animals, including man, tense in situations which involve the security of themselves and their loved ones.

b. Pathological tension is an exaggeration of normal tension and fairly rare. This type of tension usually requires that the subject be put under the care of a physician.

c. The vast majority of people and shooters who are concerned with tension have nothing more than normal tension. All they need is a technique for relaxing. You should know what tension is and a few hints on how to minimize its effects.

2. In normal tension, your body undergoes certain definite changes. Adrenalin pours into your bloodstream and your liver releases sugar, giving a supply of energy to your muscles. Your entire nervous system shifts into high gear. It causes your sense of smell, hearing and sight to become sharpened and all your mental faculties to become razor keen. Your stepped-up nervous system also causes the large voluntary muscles of your legs, arms and torso to contract, ready for action. The muscles of your digestive tract cause your digestion to slow down for a while. Your chest and arterial muscles contract slightly so that your breathing becomes a bit shallower and your blood pressure increases. When all these things are happening, you are experiencing normal tension. Most of us experience this kind of tension one or more times a day. When the problem which caused you to be tense has been solved, your tension will subside and you will return to a normal state of relaxation. It may leave slowly but it will leave. Normal tension is self-limiting, it does not continue unabated after you need it.

3. Pathological tension is when your whole body over-reacts, as if the difficulty confronting it were a life or death matter. It is the kind of reaction a normal person would have only in an extremely dangerous situation. In pathological tension, blood pressure, heartbeat and pulse go way up and stay up. Excessive adrenalin may result in jitteriness, flushing and trembling. The digestive actions of the stomach usually stop entirely and will not resume, causing loss of appetite or indigestion. Muscles tense for action but may end by cramping. There is rapid, shallow breathing to the point of dizziness. The inevitable, and often swift result is a sense of deadening fatigue. Normal tension may make you feel exhausted too, but not to this degree.

4. Tension Reducing Techniques:

a. Take a breather. Breathe deeply, three times, very slowly; at the end of each exhalation, hold your breath as long as possible. When you have finished, you should feel noticeable relaxed and much-calmer. By forcing yourself to breathe deeply, you break the tension of your voluntary breathing muscles. This causes the involuntary muscles of the lungs, gastrointestinal tract and heart to relax too. This is the simplest method for relaxing. For some, it can be used to end tension completely. It can be used by others for temporary relief when they do not wish to "let down" completely.

b. Let go. Sit down and let your head droop forward. Try to actually concentrate on relaxing the muscles. Make one arm relax completely; then the other. Now let your legs go completely limp; now your torso muscles. Stay in this posture for several minutes. Momentarily divorce the

competition completely from your mind. This technique is aimed at relaxing the voluntary muscles. It is especially effective when you have had to maintain normal tension for several hours on end.

c. Stop and Think. When the tension-making job allows a respite, sit down and calmly review the things in your life that you value highly. Think of the long range purpose of your life, of the people you love, the things you really want. In a few minutes you may notice that you have involuntarily taken a deep breath. This is a sign that tension is dropping away rapidly. When you tense to face a difficult situation, you tend to exaggerate its importance. Judgment and reason can quickly change this mental state when it is time to relax again.

d. Take a Break. This is a "Remote Control" technique for dealing with normal tension. Simply take a break for ten full minutes every hour. You may find that this allows you to ease out of your working tension more quickly and easily.

e. Shift Into Low. Taper off at the end of the day by becoming involved in a diverting activity. If you like handiwork, pick a kind which is interesting but not too creative. Soap sculpture, finger painting, woodworking, and gardening all are excellent low-gear activities that will help you to "simmer down". This kind of tension-remover is aimed at changing your mental "set". It is helpful for those who have to operate at top capacity. After stimulation, a part of your mental capacity will continue to be aroused. To slow you down when you are in this state of mind, you require something which is engrossing but which demands nothing of you intellectually. Television entertainment and simple handicrafts are ideal.

f. These techniques are based on the fact that tension can be ended in two distinct ways: through the relaxation of your voluntary and involuntary muscles; and by changing your mental "set". If you achieve either, you modify the other and hasten the process of normal relaxation.

H. YOU CAN WIN!

1. Confidence furnishes the alloy to stiffen the will to win and not give up or compromise. Confidence is based on a full grasp of the complete technique of controlling employment of the fundamentals. Confidence combined with knowledge, good physical condition and a determination to win, will allow you to perform at your best. A chance at greatness lies in each man's grasp. You must have confidence that you are capable of a performance exceeding any previous level of personal accomplishment. Know that you can win if that is what you set out to do.

2. Be a hungry shooter. The slashing onslaught of a voracious appetite for victory destroys the resolve of the lesser competitor.

Chapter VIII

Physical Conditioning

A. GENERAL

1. The objective of physical training in a pistol marksmanship training program is to condition the shooter physically, to better withstand the rigors of match conditions. An individual in good physical condition has better developed reactions, better control of his muscles and better endurance; all of which promote consistency in performance.

2. It is important that physical training not be of haphazard nature, nor should it be timed immediately before a pistol match. A shooter should perform physical exercises regularly, both during the preparation period between shooting seasons and during the period when the shooter is training for tournament participation. Morning limbering up exercises are important in this connection, and they should become a part of a shooter's daily routine. It has been found that a physical training program should be discontinued approximately 3 days prior to a match and resumed immediately thereafter.

3. Physical Conditioning must consist of exercises of a general nature directed toward strengthening the muscles, proper breathing, developing body flexibility and precision of movement. The requirements of marksmanship are such that drills must consist of exercises which develop the muscles and flexor of the arms and fingers, and the muscles of the shoulders and waist. A certain amount of static tension (dynamic) type exercise is valuable if it is not overdone.

4. Whenever the shooter exercises, he must put the maximum effort into the exercise. Merely going through the motions of an exercise is of no advantage. Physical conditioning is a gradual process and results will not be apparent immediately. As the shooter's physical condition improves, the number of repetitions may be gradually increased. Heavy exercise such as serious weight lifting should be discouraged.

5. Any sport that encourages regular physical activity is beneficial to a shooter. It is recommended that each shooter cultivate an interest in a sport that will insure sufficient exercises for all around physical fitness.

6. A muscle builds more rapidly under tension applied vigorously.

7. The stronger the muscle structure is developed, the surer movement can be coordinated and positions held. Besides general conditioning practices, durable muscle tension exercises of the trunk, shoulder and arm muscles make the most sense. Resistance exercises and grip exercises are in order. Physical training should take place at least three times a week for 30 minutes to an hour.

8. Sleep: During the training period the shooter needs plenty of sleep to give all the organs a chance for sufficient rest. Eight hours should be the rest interval. Before matches, insomnia sometimes occurs due to excitement. Under such conditions no sleeping pills should be taken the night before a match for they work out unfavorably the next day. Short walks in the evening, warm showers or a small snack will sometimes induce sleep.

9. Detrimental habits: Nicotine, caffeine and alcohol reduce the performance ability of the body and effect the ability to concentrate. (See Chapter X, "Effects of Alcohol, Coffee, Tobacco and Drugs.")

10. Overall behavior: Before a match the shooter should avoid all types of excitement. For example, he should not drive fast and, if possible, arrive at the range one-half hour before the beginning of the match. That will give him plenty of time for his last preparations and he can prepare himself inwardly for the test ahead. The individual feeling of well being is the best measure of whether or not your

living habits and daily routing is in the best interest of your shooting.

B. BASIS FOR A GOOD PHYSICAL CONDITION,

A physical training program should be progressive. It is not necessary or is it generally considered wise to strive for the peak condition sought by a track athlete or a professional football player. Violent and strenuous athletics which may result in injuries should be avoided.

The competition shooter must possess the following basic physical and physiological characteristics:

1. An adequately developed muscular system (this is especially true for the muscles of the abdomen, arms, and legs) and the endurance to fire many shots without perceptible worsening of results.

2. Lungs must have a high oxygen assimilation factor so that long pauses between inhalation will not cause oxygen starvation.

   NOTE: A smoker's lungs do not have a desirable oxygen assimilation factor.

3. Precision and coordination of bodily actions and thoughts. The physical training of a pistol shooter must be directed to the development of these qualities.

C. TYPE OF EXERCISE.

There are many different general types of exercises and activities that a shooter can use to his advantage.

1. Walking is a very good exercise. When walking, don't just take a slow window shopping walk. To get any good out of it, you must make the walk very brisk.

2. Running: Results already obtained indicate a running program improves overall physical fitness, especially in endurance capacity and overall improvement of the heart, lungs, and the entire circulatory system.

   Running and walking for a period of 12 minutes at least three times a week is, in itself, a splendid conditioner. Here again, the individual must apply himself diligently for the duration of the exercise period.

3. A series of mild, non-strenuous exercises of the type that require body bending, stretching, deep breathing and moderate muscular tension are best suited to obtaining a condition defined as good body tone and a feeling of well-being. Sore, aching muscles tend to fatigue quickly, and nervous tremor usually results.

4. In Swimming almost all of the muscles get a workout. Here again, the exercise should be pursued with moderation.

5. A good exercise to build the wrist and arm muscles in the wrist and forearm developer, roll-up exercise. A mop handle, a short length of rope and a weight, Roll it up and let it down slowly.

6. A method of developing the grip is by using a sponge rubber ball about 3" in diameter, cut in half. Squeeze the ball with the shooting hand. You can take this aid with you almost any place you go, and exercise any time that you are not using your shooting hand.

D. THE PISTOL TEAM DAILY DOZEN EXERCISES.

The Pistol Team Daily Dozen was especially developed to affect those muscles used in pistol shooting. Figures 8-1 thru 8-12 will assist the instructor in understanding how these exercises are accomplished.

1. **Warm Up:** A four count exercise done in moderate cadence. This exercise is designed to get you ready for the forthcoming exercises. Starting position is standing with feet spread approximately 12 inches apart, hands extended overhead. At the count of one, bend at the waist ant knees, reach down between the legs, and place hands on ground. On the count of two, straighten body up, extending the hands over the head; at the count of three, perform same as number one; at the count of four, repeat number two.

2. **Cat Stretch:** The starting position is a modified leaning rest, the buttocks being higher. This is a four count exercise. Count of 1 is upward, pushing the buttocks higher. Count of 2, back to starting position. The count of 3 upward and on the count of 4, back to the starting position. This exercise uses the back and shoulder muscles.

3. **Body Twister:** The starting position is standing with arms extended parallel with ground, feet spread approximately twelve inches apart. This is a four count exercise. At the count of one, swing the arms to the right, keep the shoulders and arms rigid so the twisting movement is from the waist. On the count of two, swing to the right and front. At count of three, repeat count one to the left. At count of four, face to front. This uses the muscles along the sides and back of the trunk of the body.

4. **Push-Up:** The starting position is standing. This is a four count exercise. At the count of one, squat with hands on ground; count two, extend legs. Count three, cause the body to move downward; keep the body straight at all times. At the count of four recover to the raised position. Continue counts three and four as desired. End exercise by recovering to standing position. This uses the arms and shoulder muscles.

5. **Back Bender:** The starting position is standing with the feet spread twelve inches apart, hands on back of neck. On the count of one, bend back at the waist. On the count of two, recover. Count of three, bend backward at the waist; count of four, recover. This uses the back and stomach muscles.

6. **Hip and Leg Spreader:** The starting position is with the hands and toes on the ground. This is a four count exercise. At the count of one bend the elbows and touch the chin to the ground at the same time extending the left leg back and up. Count two, recover. The counts of three and four are repetitions using the right leg. This uses the arm and leg muscles.

7. **Shoulder Exerciser:** Starting position is standing with the feet spread and hands and arms at the sides. This is a four count exercise. At the count of one, extend the arms sideward, parallel to the ground. Count of two, rotate arms. Count of three, touch shoulder with hands. Count of four, recover. This exercise is to be done with dumbbells if available. This uses the muscles of the arm and the shoulder muscles.

8. **Abdominal Kick:** The starting position is lying flat with the arms extended to the side; at the count of one, raise your body with the weight on the buttocks and hands, legs straight together, about 15 degrees off the ground. At the count of two raise the legs toward the chest. Count of three, extend the legs outward, keeping the feet off the ground. Count of four, recover to starting position. This uses the stomach and leg muscles.

9. **Side Bender:** The starting position is standing with the feet together, arms at sides. At count of one, extend arms overhead, shift weight to bended left leg. On the count of two, bend at the waist to the side, count of three, recover to count one. Count of four, recover to starting position. Count 5, 6, 7, and 8 are a repetition, only bend to right. This uses the muscles along the sides of the body.

10. **Body Kick:** The starting position is flat on the back, arms behind head. At the count of one raise the body at the waist. Count two, resume flat position. At the count of three raise body and lift the right leg upward. Count of four, drop the right leg and lift the left leg. Count of five, drop left leg and lift right leg. Count of six, resume flat position. This uses the stomach and leg muscles.

11. **Triceps Exerciser:** The starting position is standing, arms at sides. At count of one, bend forward at the waist, arms hanging down. Count of two, raise arms parallel with the body. At the count of three, extend the arms to the left foot. Count of four, recover to count two. Count of five, extend the arms to the right foot. Count of six, recover to starting position. This exercise is to be done with dumbbells if available. This uses the triceps muscles.

12. **Leg Spreader:** The starting position is lying flat for count one. At the count of two, throw the legs back over the head, legs spread; extend the arms parallel with the ground. At the count of three, recover and reach for ankles. At count of four, resume lying flat. Count of five, spread legs and arms. Count of six, recover to count one. This uses the leg and stomach muscles.

To be effective, physical training for the pistol shooter must be realistic and continuous. The objective is to continue to condition the body so that the general health is excellent and that the muscular and nervous systems are fully capable of withstanding the grind of match conditions and enable the shooter to continue to assert his utmost skill.

Chapter IX

Diet and Health of the Competitive Pistol Shooter

A. GENERAL.

What is meant by good nutrition? Gayelord Hauser, America's famed Diet and Health specialist, answers as follows: "First, it is adequate nutrition, giving the individual cells of the body not only the quantity but also the quality of nourishment they require. Second, balanced nutrition, supplying the body cells with vital nutrients in the proper proportion. As a simplified illustration, think of your body as a motor car. It is made of protein, inside and out. Arteries, glands, colon, connective tissue; muscles, skin, bones, hair, teeth, eyes: all contain protein and are maintained and rebuilt with protein. Fats and carbohydrates are your body's oil and gasoline, they are burned together to produce energy. Vitamins and minerals are its spark plugs, essential to the utilization of food and its assimilation into the blood stream. It is a marvelously sturdy motor car, this body of yours - marvelous in its ability to maintain and rebuild itself. Given care, consideration, and respect, it will function smoothly. Neglected or abused and it will break down. Scientists are unanimous in agreeing that over-nutrition, through excess calories stored as fat, can contribute materially to physical deterioration. "

B. THE IMPORTANCE OF PROPER DIET AND NUTRITION TO COMPETITIVE SHOOTERS.

The army trains men to be winners. Winners in combat and winners in any competitive activity. If the pistol competitor falters, his energy exhausted, it must not be because of a diet deficient in essential nutrients.

Proper nutrition will assure strength and endurance to perform your job well. Your job is to shoot championship scores in every match fired all day long, not just the first match or two of the day.

The expert marksman must feel well and be energetic to shoot well. No stone can be left unturned in today's level of competition that will provide that important "edge" that may be the narrow margin of victory.

Good nutrition is based on a diet that includes all the essential nutrients. These nutrients are found in a wide range of foods.

C. THE ESSENTIAL NUTRIENTS.

The essential nutrients are Protein, Fat, Carbohydrates, and protective ingredients or Vitamins.

1. Proteins are the body's building blocks. As the house builder uses various building materials to construct a house, proteins build and replace the body's tissue of muscle, nerves, tendons and all of the vital organs, etc. This is done in the form of amino acids. For instance, the lining of the gastrointestinal tract is renewed every three days.

2. The protein built body must have fuel to consume as it moves about and also take care of the energy demands of the vital body functions. The body maintains a reserve of energy by converting fats to glucose and storing it in the liver.

   Fats and fatty acids are the long range source of energy. The fat in the diet provides the full gas tank reserve for endurance. Part of the fatty acids are converted to easily digested sugar forms that are stored in the liver. The fatty acids that are not held in reserve in the liver provide for part of the present energy needs of the body or they are deposited in and about the muscular system. The

complete absence of fat in the diet means slow starvation even if the other nutrients are ample.

3. There is another source of energy but a smaller portion of the amount eaten goes into the ready reserve.

   Carbohydrates are the high octane energy source. Compare fats and carbohydrates to the relative combustion qualities of oil and gasoline respectively. Both will burn but gasoline is ignited easier and burns quicker. Starches and basic sugars are converted into a more readily useable glucose at a relatively faster rate than fats. In this form, they are absorbed by the blood system and supplied to the muscular tissue to furnish needed energy.

   For example: Alcohol, a starch food, can pass through the entire gastrointestinal tract without being altered in any way and yet be absorbed readily. There is no question about the energetic effect it has on some people.

4. Vitamins aid the breakdown of nutrients into usable forms. Protective ingredients or vitamins are not considered to be a food but they are essential to proper nutrition. Vitamins are a means of triggering the chemical reactions that convert the essential nutrients into useable forms in the digestive process. For example, the automobile carburetor converts gasoline from a liquid into a more usable form of a vapor of gasoline molecules mixed with a large proportion of air.

D. TYPES OF FOOD THAT SUPPLY NEEDED NUTRITION.

The pistol shooter can be assured of receiving the important elements of nutrition in his diet if certain representative foods of each type are known to him.

1. There are three foods that are the main source of protein in the diet.

   Proteins are mainly supplied by eggs, meat and milk. A shooter of 140 pounds should consume 100-120 grams of protein in his daily diet. Approximately one half should come from the animal source foods; eggs, meat and milk. The remaining amount can be obtained from the usual sources of bread and vegetables.

2. The same basic foods provide a source for another essential nutrient, fat.

   Fats or fatty acids are obtained from animal fats and vegetable oils. The average shooter consumes too much fat. While in training, a 140 pound man should consume 70 to 90 grams of fat tally. Half of this amount should come from animal sources such as eggs, meat and milk. The remainder should come from vegetable oil sources such as peanuts, corn, soya and olives. Moderation in the use of fats is especially beneficial to the digestive process.

3. There are two main sources of carbohydrates.

   Carbohydrates in the form of starches and sugar are contained in nearly all foods. It is important to give preference to such starch and sugar sources such as dark bread, fresh fruit, unpolished rice, milk, oatmeal, fresh vegetables and potatoes with the jackets on, because of the high content of protective ingredients or vitamins. Stay away from that enormous birthday cake with its gleaming white icing!

E, VITAMINS.

1. Protective ingredients or vitamins are found in most foods. In addition the human body manufactures some vitamins but usually in amounts too small to meet its needs. Some vitamins cannot be stored in the body and must be replenished daily. Vitamin pills which contain a minimum adult requirement of most identifiable vitamins should be taken only on the advice of a doctor. Your diet may be furnishing all the vitamins you need.

2. The best source of vitamins are foods in which they are naturally present. Of special importance to the shooter are the following vitamins and sources:

   a. Vitamin A; is found in carrots, spinach, sweet potatoes, milk, liver, egg yolk and green and yellow vegetables. This vitamin builds resistance to the infection and helps the eyes to function normally in light of varying intensity. This feature is an aid in night vision. Vitamin A prevents and cures pellagra, a disease of the eyes and skin.

b. Vitamin B1; found in yeast, most meats, especially beef and pork, whole grain cereals, beans, peas, nuts and green vegetables. A deficiency of this vitamin causes great and persistent fatigue, aching leg muscles and bones and illness of the nervous system. Vitamin B1, prevents and cures beriberi, primarily a disease of the nervous system. Chronic alcoholics sometimes develop symptoms of the disease because alcohol diminishes the appetite and they fail to receive proper nourishment.

c. Vitamin C; the body does not store this vitamin and it must be replenished daily. It is found in citrus fruits, tomatoes, raw cabbage, strawberries and cantaloupe. Vitamin C promotes a healthy circulatory system, which is important to body energy; develops good sound bones, and teeth. This vitamin prevents and cures scurvy, a disease known by general listlessness and fatigue; sore, inflamed gums and various other dental disorders.

d. Vitamin D; is a fat soluble vitamin that prevents rickets. It becomes active when exposed to ultraviolet rays. Two variations of this vitamin are important in nutrition. One is vitamin D supplied by plants. The other, vitamin D3, is found in fish-liver oils, irradiated milk, and in all irradiated animals proteins. Scientists believe that vitamin D3 forms in the skin when the body is exposed to sunlight. Because of this it has been called the "sunshine vitamin. " Doctors have found that lack of vitamin D leads to serious bone changes. However, they have found that excessive amounts also cause serious bone changes.

e. Vitamin E; is a fat-soluble substance that scientists believe may be necessary for reproduction. All the functions of this vitamin are not known. The best sources of Vitamin E are wheat-germ oil and lettuce. Whole-grain cereals, meat, milk, eggs, liver, and most Vegetables also contain it.

f. Vitamin K includes a group of fat-soluble vitamins that are essential for making the blood clot. These vitamins are rather abundant in food. They are found particularly in the green leafy vegetables such as spinach, cabbage, kale, and cauliflower. Pork liver is also an excellent source. Intestinal bacteria manufacture vitamin K in the body. Therefore, deficiencies of this vitamin are rarely the result of poor diet. But deficiencies can result when something interferes with the normal function of the intestinal tract.

g. Certain minerals, including iron, copper, sulfur, calcium, phosphorus, iodine, and sodium, are needed for growth and to maintain tissues and regulate body functions.

E. YOU MUST HAVE STAMINA AND READY ENERGY TO BE A CHAMPION.

The lack of forceful energy to carry on under a prolonged condition of stress can be corrected to a degree by proper, balanced nutrition. You must select the various types of food that provide this needed energy.

A strong, well nourished body will allow sustained physical and mental effort under the stress of competitive shooting.

Last years beginner can become the champion this year if he learns to eat the foods that will supply him with the stamina to keep up the fight, regardless of the odds against his winning the match.

Chapter X

Effects of Alcohol, Coffee, Tobacco and Drugs

A. GENERAL

The habitual use of alcohol, coffee, tobacco and various drugs is harmful to the average person and in no way promotes better body function. We can be easily fooled by misleading advertisements into believing that such things are helpful. For example, an advertisement may tell us that cigarettes are an aid to digestion. Cigarette smoking after meals does cause the saliva to flow more freely and the heart to beat faster, aiding digestion. But, this may also result in overwork for the salivary glands and the heart. In like manner, many people may believe that a highball or cocktail at the beginning of a meal promotes digestion because of the greater flow of the digestive juices that alcohol causes. And what about that change of pace drink, tea? It is no different in caffeine content than coffee but possesses increased amounts of tannic acid.

1. Inform yourself. Any drug which causes the body organs to perform their work at a greater rate than normal, fatigues them sooner and causes them to age more rapidly. Stimulants and depressants overwork many vital organs, often when their best performance is needed for normal body activity. The effects of the use of such substances depend upon how much is used and whether or not the body is strong enough to repair the damage done.
2. In order to understand the discussion that follows there are certain terms whose specific meaning you should know. A stimulant is a chemical which, when taken into the body, excites the organs to greater effort. Depressants are chemicals which slow down body action but may also speed up body functions by reducing the influence of the nerve centers which slow down body action. For example, nicotine increases heart action by depressing the nerves that slow the heart beat, thus causing a faster pulse. Depressants deaden pain and lessen discomfort and thus make us feel better without removing the cause.
3. Much has been written and said both pro and con concerning the habitual use of alcohol, coffee, tobacco, and drugs, their temporary and permanent effects on the human body, both mental and physical. Material covering these subjects is available at any well stocked library. Part of the information that follows was derived from this source but much of the evidence against alcohol, coffee, tobacco and drugs that we are concerned with has been contributed by the shooters themselves.
    a. Although all shooters are not in agreement that complete abstinence by habitual users is the solution, all will agree that these agents will in no way help to improve shooting performance or scores.
    b. To learn the fundamentals of pistol shooting is no great achievement in itself. Anyone interested in becoming a pistol shooter can with persistency and training learn to shoot with some degree of proficiency. What then, is necessary to become a skilled shooter ? The top shooters in the nation today unanimously agree that control is the most important factor in becoming a top competitor. Control can best be explained as the coordination of mental and physical effort, born in thought and culminating in a concentrated, precise action. This effort must be natural, unstrained and smooth flowing. Any habit or action that results in departure from perfect coordination will lesson the degree of control and reduce the effectiveness of the action. In shooting, lessening of control shows itself in lower scores and poor performance.
    c. What can you the shooter do about sustaining control? The same thing you would do when training for a match. When you find yourself having difficulty in maintaining your shot groups in

the center of the target, you analyze and make corrections, be it position, grip or sight adjustment, etc.. Sometimes when control is declining, analysis may pinpoint some cause other than faulty technique in employment of the fundamentals. What did you have at breakfast? Coffee, two cups and two cigarettes. Enough to ruin anyone's control. Perhaps a few too many last night and a loss of several hours of sleep. Whatever the reasons, they should be noted in your score book just as you would enter unusual conditions at a match. In a short period of time, if you are honest with yourself you will be able to piece together enough information upon which to take remedial action. The most difficult person to convince is yourself. No one who habitually smokes or drinks coffee wants to admit that such habits have the effect of destroying control. So they remain slaves to habits which, in affect, they attempt to overpower by mental and physical exertion, often ending in frustration and exhaustion.

The following paragraphs cover the effects that alcohol, coffee, tobacco and drugs have on control of pistol shooting. If you have been plagued with a built-in error, it may be that the answer to your problems lies herein.

B. ALCOHOL (ETHER)

1. Effects of alcohol on the human body:

   The name alcohol is used for a number of organic substances some of which, like glycerin, are necessary to good health. The scientific name for the alcohol sold for drinking purposes is ethyl alcohol. Ethyl alcohol is generally considered to be a habit forming narcotic. However, in the strictest scientific sense it is an anesthetic or pain killer like ether, which is made from it.

   a. Alcohol taken into the body passes through the walls of the stomach and the small intestine and thence into the blood stream. It is rapidly distributed through the body and promptly affects the brain by decreasing its ability to take up oxygen. Even a small percentage of alcohol in the blood may sometimes cause remarkable effects. Inhibitions and the corresponding cautions are removed, reactions are slowed, coordination is impaired. The senses become less acute, particularly that of sight. The field of vision is reduced - ordinary objects become darker and indistinct - poorly lighted objects are lost entirely. Reactions are slowed down and concentration becomes difficult.

   b. A peculiar property of ethyl alcohol is its ability to take up water. It is a valuable dehydrating and preserving agent. When used as a drink, alcohol produces a burning sensation as it takes up water from the delicate mucous membranes of the throat, stomach, and intestines, thus causing the drinker to become thirsty. Once alcohol becomes a part of the blood, its dehydrating properties are much reduced.

   c. Although alcohol is a source of heat energy, its depressing effect upon the nerve centers that control the size of blood vessels causes the blood vessels of the skin to enlarge. So long as alcohol remains in the blood to affect the brain, extra heat loss by radiation will take place through the skin and prevent any benefit that might be derived from its oxidation and the resulting warmth. For this reason, in severely cold weather, the man who drinks whisky to keep warm is in much greater danger of freezing than the person who does not.

2. Effects of Alcohol on Shooting:

   a. Contrary to popular belief, alcohol acts as a depressant rather than a stimulant. It dulls the senses, lessens the desire to win, destroys coordination and lessens the shooter's ability to concentrate. Alcohol taken at the proper time in the proper amount might possibly lessen the shooter's anxiety but by doing so other effects are released that are far more harmful to the body and detrimental to the shooter's score. No one can say what the right amount is or when it should be taken. Some shooters may shoot a good score with a hangover. But, the second day is when the after affects become acutely noticeable and the shooter's control may disintegrate on the firing line.

   b. Experimental research scientists using delicate tests and sensitive instruments, have been able to demonstrate the adverse effect of even small amounts of alcohol on various isolated bodily functions such as sensory perception and discrimination, reaction time, fine coordination, judgment, alertness and efficiency of dexterity. The changes observed have no apparent difference in quality, magnitude or expression from those due to fatigue, hunger, distraction and a host of other environmental factors. These facts establish that one small drink of intoxicating beverage places the shooter under an enormous handicap. The false feeling of well-being is deceptive. Alcohol, and gun powder do not mix.

C. COFFEE (Caffeine)

What's wrong with drinking coffee? That is easy - caffeine. Each cup contains an amount equal to about two pinches of salt. That doesn't sound like much, until you realize that it is one-third of the amount given by doctors as a heart stimulant. With three cups of coffee you are getting a dose of caffeine calculated by scientists to be medically effective for making a weakened heart work as hard and fast as a normal heart. When a heart is ready to quit, and won't pump another beat without the help of caffeine, maybe such a measure is justified. Are you sure your heart is ready for a synthetic jolt three to six times a day?

1. Effects of Coffee on the Human Body: Many coffee drinkers say they can't do without it as a pick-me-up during the day. But let us see what really happens after that coffee break. Dr. Rolf Ulrich, in his book, "Coffee and Caffeine", reports that after coffee consumption, mental tempo rises first, and speed of association increases, but there is a noticeable decrease in the quality of work being done. In test examinations it was seen that the subjects finished quicker, but that false conclusions were more frequent. Reliability and accuracy definitely took a beating as a result of a coffee pep-up.

   The physical result is the same. Caffeine raises muscular output temporarily, but in severe physical demands of longer duration, the muscular output decreases. As a famous scientist has said, "Coffee acts like a spur, which drives a horse to do its best, but cannot replace oats. ". That is the whole problem in humans - many of them do expect coffee to take the place of "oats". They pass up a solid breakfast because they can get by with coffee. The stimulating and exhilarating affects coffee produces is usually followed by a loss of energy and a feeling of unsteadiness. No matter how we look at it, coffee takes more from the body than it gives. All coffees contain caffeine but in varying amounts. Fresh ground coffee is the most potent in caffeine. Instant coffees contain half as much and decaffeinated coffees contain about one third as much. It is imperative that a shooter refrain from drinking coffee before and during the shooting session and be moderate in coffee consumption when not firing.

2. Are you considering a change of pace drink, like tea? Before you do, read the following:

   It is not generally known that tea has larger amounts of caffeine and tannic acid (the two most detrimental ingredients) per weight, than coffee. Caffeine in tea leaves is about three percent in ratio of one to two percent in coffee. The general effects of caffeine are cerebral, cardiac and diuretic (copious urination) stimulation. As to tannic acid, tea leaves have about ten percent while coffee berries have only about five percent content. Tannic acid, when brought into contact with mucous membrane, acts as an astringent and diminishes its secretions. It coagulates albuminous substances and thus hardens animal source food matter in the stomach with which it comes in contact. It also leads to more rapid clotting of the blood when absorbed into blood circulation. There is evidence of liver damage from extensive use. In solution, it is unstable and should not come in contact with metals. Since coffee is made about twice as strong as tea in liquid form, a strong cupful of either will contain about two grains of caffeine and over three grains of tannic acid.

3. A shooter should stay away from the colas. Cola drinks, in addition to other soft drinks, contain that well known perk-up ingredient, caffeine. The bottles of some brands contain a listing of cola contents which should serve as a reminder. Know them and avoid them while shooting.

D. TOBACCO (Nicotine)

For a period after January 1964 when the U. S. Surgeon General (see paragraph D-3, this chapter) revealed to the American public the results of an investigation into cigarette smoking and health, many smokers quit the habit. At the end of one year a poll taken revealed that one out of every four hundred smokers had quit. This small percentage points up the fact that most smokers will continue the habit no matter what the future consequences might be. The smoking habit is easily acquired and even after a short duration becomes a difficult habit to break. For this reason one who has not yet acquired the habit should be encouraged to abstain. The objective of this section is to provide you the shooter with information that will enable you to establish control of smoking in order to improve your shooting. Who knows, once you gain control of the smoking habit and can turn it on or off at will you might be inspired to quit all together.

1. The Effects Tobacco has on the Human Body. Nicotine is a powerful alkaloid poison. Its chemical formula in C10H14N2, which means that it contains carbon, hydrogen, and nitrogen in the proportions indicated by the numbers.

   a. Being a volatile substance, it is carried along with the burning smoke of the tobacco. In cigarettes about 61 percent of the nicotine is burned and destroyed, 27 percent is ordinarily exhaled, and about 12 percent is absorbed by the smoker. The absorbed nicotine specifically affects the

nerves that regulate the heart rate and the size of the blood vessels, and, therefore, alters the pulse rate and the blood pressure. For about ten minutes after smoking is begun, the pulse rate is slowed about five beats per minute because of an increased stimulation of the nerves that slow the heart beat. After this temporary slowing effect, nicotine depresses these same nerves. This results in an increased pulse rate that lasts for two or three hours. The increase, for the average person, is from five to ten extra beats per minute. One cigarette after breakfast will step up heart beat for half the shooting day. With the damage already done, abstaining for the rest of the day's shooting is to small avail. The work of the heart is affected not only by the increased pulse rate but also by the decrease in size of the arteries. Both of these factors raise blood pressure and increase the work of the heart.

b. The carbon monoxide which is also present in tobacco smoke will, if inhaled, reduce the capacity of the hemoglobin of the red corpuscles to carry oxygen. This is due to the fact that hemoglobin absorbs carbon monoxide about 300 times faster than it does oxygen with which it ordinarily combines. Therefore, to the extent that the blood takes on carbon monoxide it cannot in that same proportion, carry oxygen. This results in "cutting the wind", or breathlessness, whenever there is exertion.

c. In 1959, the American Cancer Society began a study to prove that there exists an association between cigarette smoking and many physical complaints. The study involved 1, 079, 000 men and women (smokers and nonsmokers). For comparison purposes we have listed five of the more important complaints:

COMPLAINT CIG. SMOKERS NON-SMOKERS

Cough 33. 2% 5. 6% Loss of appetite 3. 3% 0. 6% Shortness of breath 16. 3% 4. 7% Easily fatigued 26. 1% 14. 9% Loss of weight 7. 3% 4. 5%

One can readily see that the complaints were more prevalent among the cigarette smokers than non-smokers. The study further revealed that lung functioning is affected if one inhales cigarette smoke regardless of age. For example: A young man who smokes one pack of cigarettes per day has the same efficiency of lung functioning of a man 20 years senior to him who does not smoke.

2. Effects of Tobacco on Shooting:

a. The combined effects of nicotine and carbon monoxide explain why the pistol shooter must avoid smoking if he is to shoot with the greatest possible skill. This conclusion does not mean that an individual or a team whose members smoke may not win, if it is competing against inferior opponents, but it does mean that any individual shooter on a team cannot perform at his best if he uses tobacco. The top competition today does not allow a margin of indulgence if you expect to win. Denying yourself a quick drag on the weed is not a sacrifice, it is a necessity for victory.

b. Simply explained, cigarette smoking affects the smoker by:

(1) Initially, slowing the pulse rate.

(2) Increasing the pulse rate.

(3) Increasing blood pressure and overworking the heart.

(4) Reducing the oxygen capacity of the blood, causing shortness of breath.

(5) Bringing on fatigue more quickly.

c. From the standpoint of shooting, smoking does affect performance, and more importantly, control. It is possible to become more proficient in shooting and still continue smoking, but the road is long and the progress slow. Many of our top shooters can attest to that fact. Today most of the top shooters are in the non-smoking class. It is not that they have never had the habit, but that the determination to reach the top was stronger than the addiction to tobacco. Occasionally, you may see one sport a cigar, but seldom, if ever, will you see one inhale tobacco smoke. Consequently, the crux of the problem of smoking is the inhalation of tobacco smoke. Herein lies the answer. Stop inhaling and you have solved the problem. It is the inhaled nicotine and carbon monoxide that are responsible for upsetting the normal body balance. For this reason we find many shooters making the switch from cigarettes to pipes and cigars, since the smoke of each is generally too toxic for the normal person to inhale. Performance as well as health improves accordingly. For the shooter who will consider quitting, we offer a plan, entitled "You Can Quite Smoking", paragraph D-4, this chapter. Mark Twain once said that he had no difficulty giving up smoking, and added "I have done it a thousand times". If you decide though, make it permanent.

3. The report of the Surgeon General of the US Public Health Service, released on 11 January 1964.

   "SMOKERS DIE EARLY" it says, "Smoking cigarettes is a health hazard that calls for corrective action - and is a major cause of lung cancer and other death-dealing diseases, especially in men", a blue-ribbon federal panel reported.

   In short, the panel indicated, the more you smoke, the greater your risk of an early death. Deeply inhaled cigarette smoke sends a threat of premature death spreading through the lungs, arteries and the heart itself.

   a. Lung tissue was obtained from more than 1000 postmortems, put on microscope slides and carefully examined by pathologists. The slides were identified only with coded numbers, and pathologists did not know their origin. Later, statisticians matches the pathological findings with the histories of the dead patients. The results added up to an elaborate description of progressive smoke damage.

   b. Deeply inhaled smoke, the researchers found, irritates the cells that line the tiniest chambers of the lung (alveoli). The walls of the alveoli thicken, lose their elasticity and much of their ability to do their vital job of exchanging carbon dioxide for oxygen. Subjected to sudden stress -- such as a cough or sneeze -- the alveolar walls rupture; a minute part of the lung becomes useless.

   c. Even while it is attacking the alveoli, smoke also damages the small arteries that carry blood to the interior lung surfaces for oxygenation. The artery walls become fibrous and thickened. Soon, internal deposits on the thickened walls make the arteries so narrow that little blood can get through. Eventually many tiny arteries are blocked completely.

      These two sets of events alone would be enough to explain why thousands of Americans are "lung cripples", suffering from what most U. S. Doctors call pulmonary fibrosis and chronic emphysema. But the damaging chain of events runs on.

   d. The destruction of smaller blood vessels in the lung and the thickening of slightly larger ones increases the blood pressure in the pulmonary arteries and puts a strain on the right side of the heart. It also prompts the left side of the heart to work harder to pump blood against increased resistance. A healthy heart could probably stand the extra work; a heart already weakened by other difficulties might fail.

   e. Even while the heart is being asked to overexert, carbon monoxide from cigarette smoke combines with red blood cells decreases their capacity to carry oxygen. As a result, the hardworking heart muscle is given less fuel to do its job. At the same time, tobacco's nicotine causes a constriction of small arteries in the extremities and speeds up the heart, increasing its need for oxygen and complicating the coronary problem.

   f. Smoking dulls the sense of taste causing loss of appetite, thus creating a loss of weight. For this reason people who give up smoking tend to stop losing weight. They begin to taste food again and enjoy eating.

4. You Can Quit Smoking!

   a. A vicious, velvety trap; Light a cigarette, smoke it, taste its bitterness, put it out. Even as you do, you know that you will want another. Not that you enjoy it. You simply want it, and why ?

      (1) When you smoke a cigarette, for instance, nicotine, carbon monoxide, small amount of hydrocyanic acid, pyridine and various phenols and aldehydes are absorbed into your lungs and mouth. Your nervous system is momentarily stimulated. Your blood pressure goes up. Your pulse rate increases.

      (2) Most important of all to the satisfaction of the habitual smoker, your blood vessels undergo a constriction. This "slows you down". That is, after the momentary stimulation, smoking depresses, for a far longer period.

      (3) When you smoke, you are artificially slowing down most of your body's normal activities. If you are suddenly confronted with an emotional psychological emergency: adrenalin is pumped into your blood stream, your muscles tense, you breathe faster and get edgy, jittery -- "nervous". Tobacco smoke retards these natural processes by slowing the blood circulation and thus "calming you down". You find a smoke is "good for your nerves".

      (4) If you smoke a pack and a half of cigarettes a day, you smoke an average of one cigarette every 32 minutes of your waking hours. That many crises don't arise every day. You need cigarettes simply because your body has come to expect this depressant effect every so

often. You begin consciously to want to cigarette.

(5) There is little true pleasure in smoking. The harsh taste, the hot dryness is tolerated, for the sake of tobacco's mild narcotic effect. If it were possible for you to go without cigarettes for the next 24 hours, and then light one, you would find out how distasteful and noxious tobacco smoke really is. If you think this is an exaggeration, try it.

(6) Think back to the time many years ago when you smoked your first cigarette. How did it taste? Gaseous, strong, biting, wasn't it? This is the experience that you may give your system 30 to 60 times a day. You are able to do it because the human mechanism is a marvelously adjustable piece of machinery which can get used to almost anything.

b. What can you do about it? You have already taken one big step toward giving up smoking: you have been thinking about the detrimental effects of smoking and about giving it up. If you want to stop smoking, think about giving it up at one fell swoop. Think of it cooly and calmly, without fear or hopelessness. Think of what it would be like to never have to smoke. Giving up smoking isn't all self-denial; there are compensations. There are so many good things to enjoy more when you give yourself a chance to fully appreciate them. You will never want to go back to smoking.

(1) When you give up smoking, your food will taste much better. Your nose and throat and lungs will not be continuously permeated with smoke. You will begin to smell the world around you. When you walk into a garden you will smell as well as see the flowers. When you get up in the morning, you won't find your throat clogged with phlegm, and you won't cough or clear your throat so often.

(2) You will actually feel far less nervous. That is hard to believe -- for during the first days of non-smoking you will be nervous. The depressant effect smoking has exerted on your body for years suddenly ends, and the unfamiliar effect is almost overwhelming. You will possibly be more emotional; you may laugh at trivial things and, for a while, be tense, jumpy. But gradually the nervousness diminishes. You will be calmer, more poised. For when you stop slowing down your body and cutting your energy with tobacco you will find that you have much more energy. There will be more time to get things done.

(3) A word of caution here. It is generally believed that a reformed smoker gains weight. If you have trouble with your waistline, remember this: when you stop smoking, you will not gain more than a few pounds. When you stop smoking, you will have a great increase in energy. In using up that energy, you will burn away a lot of the weight that you would otherwise put on.

(4) If you have read this far, you probably think you are about ready to swear off. Don't do it yet.

c. To stop smoking, follow these rules:

(1) Watch and wait until some time when your life is on a fairly even keel. Don't try it when you are leaving on an important trip, or preparing to give a big party, or when you are facing some personal emergency. Don't postpone it too long, either, or you will lose the momentum you are gradually building up.

(2) But some sunny morning -- maybe on a weekend -- you will wake up feeling especially good. You will have had a good night's sleep; you will feel fit for anything. The idea of stopping smoking will pop into your head. Why foul up a wonderful day with the noxious fumes of burning tar and nicotine? Decide, then and there quietly and firmly, that you are through with smoking! This is the moment, intelligently selected and properly prepared for, when you can get off with a running start.

(3) After you have started yourself off with as much momentum as you can, tell your friends that you have given up smoking. Don't be smug or complacent or boastful, but let people know what you are doing. Then, at some point when you are seriously tempted to smoke, the thought of all the derisive laughter you will get for giving in may well carry you over the crisis.

(4) Most smokers have fixed ideas about the occasions when a smoke tastes best. The first cigarette after breakfast, or the one with a cocktail before dinner. If such associations are likely to tempt you to smoke, brace yourself in advance for such temptations; tell yourself that such an occasion is coming, and that you must be prepared to want to smoke badly. If you hold out only for a moment, that sudden strong temptation will die almost as quickly as it arose.

(5) Don't permit yourself to make a single exception. Until the non-smoking habit is firmly

implanted, "don't". If a habit is not fed, it dies relatively quickly, but it can subsist for a long time on the slightest food. If you occasionally let yourself have one cigarette or pipe on the ground that "just one won't hurt", you will keep alive the desire to smoke. Just one drink is too many for an alcoholic, as one cigarette is too many for the heavy smoker who is trying to reform. Win the battle of the moment -- every time you say no to the temptation to smoke, you are making the next "no" easier.

(6) Baby yourself to an extent. Most of us are inclined to launch sudden, ambitious programs of self-improvement. We try to do more than we can reasonably expect of ourselves. On the contrary, indulge yourself a little. Eat what you want and enjoy it. Make it a habit to carry mints, gum, or salted nuts. During the first few weeks keep substitutes on hand -- and pop one into your mouth whenever you feel like smoking.

(7) Let your sleep work for you. On the night of the first day that you give up smoking, think for a moment when you go to bed of how today you did not smoke. Then tell yourself, "Tomorrow I am not going to smoke". Repeat it to yourself as you get drowsy. This will be the last thing in your conscious mind as you drop off to sleep. When you wake in the morning, remind yourself that you are going to get through this day, too, without smoking. Don't make a big issue of it; just briefly say: "This day I don't smoke". Even if you don't follow the other rules set down here, this exercise in "controlled sleep" could get you over the hump. You will find a sense of freedom and independence and self-assurance results from simply going half a day without tobacco. This is a sharp, continuing pleasure, and every minute helps to strengthen you against the next minute's temptation. Above and beyond this pleasant, heartening knowledge is the awareness that you are doing something of which you will be proud -- not to mention healthier and happier -- for the rest of your life. Six months or six years from now, when someone offers you a cigarette, you will refuse it, but not weakly or defensively. You will say "Thanks -- I use to smoke, but I gave it up.".

5. Expense: If a man smokes two packs of cigarettes a day for 365 days it will cost him $290.00 a year! Quit smoking and automatically you save money, remain healthy, and start winning pistol matches. This is a bargain you can't afford to overlook.

E. DRUGS

At one time or another some shooters have probably tried a sedative drug or tranquilizer to see what effects it would have on their shooting. Drugs affect different people in different ways, so dosage would be a problem even if they did any good toward reducing anxiety, nervousness, etc. Any time medication or drugs are used that affect the body functions, there is a chance that the side effects will do more harm than good to the shooter's performance.

Some shooters no doubt prescribe certain remedies for themselves when they have a cold, a stopped-up nose or a headache. Here are some of the effects of the drugs found in these and other preparations. Most of the effects are not conductive to good shooting. Most drugs are habit forming and all are a deterrent to good health if used frequently without proper medical advice. There is not substitute for good clean living, a healthy body and just plain GUTS!

1. A depressant slows reflexes, lessens the desire to win, promotes carelessness, causes loss of concentration and coordination.

2. A stimulant causes nervousness, hypertension, increases heartbeat, excessive movement of the hands, trembling, etc.

3. Drugs in daily use.

   a. Barbiturates. (To induce rest and sleep)

   Phenobarbital has special effects against insomnia. Continued use increases tolerance and leads to dependence. Acute anxiety may result if the drug is abruptly discontinued after long use. Alcoholics substitute barbiturates for alcohol and become just as devoted to it. Even after moderate doses, lassitude, dizziness, headache, nausea and diarrhea may occur. Other toxic effects are respiratory depressions peripheral vascular collapse, feeble heart beat, low body temperature and continued stupor with depressed reflexes.

   b. Analgesic (Pain relief and reduction of symptomatic discomfort)

   Aspirin - acetylsalicylic acid (relief of headache, fever and other symptomatic discomfort).

   Gastrointestinal distress due to irritation is common. Continued dosage symptoms same as quinine (Cinchonism): Dizziness, ringing in ears, impaired hearing, acidosis and depressed blood

clotting mechanism.

c. Stimulants or adrenergics (Relief from drowsiness, depression, curbing the appetite and relief from nasal congestion.)

   Benzedrine, amphetamine and ephedrine elevate blood pressure, accelerate the heart beat, causes headaches, nervousness, insomnia and spasms of the urinary bladder's sphincter. (Muscular control that permits urination)

d. Antihistamines (Relief of colds and fever and relief or prevention of allergy symptoms)

   Exerts a potent sedative effect. There is a danger of toxic action, especially drowsiness. A form of antihistamine namely, methapyrilene, is used for sedative purposes. Used in conjunction with alcohol, this sedative action is especially dangerous as alcohol heightens the depressant effect.

e. APC pills: (Relief of headache and other symptomatic discomfort) Basic ingredients usually are acetanilid or acetophenetidin and caffeine. Continued use developes a blood condition known as methemoglobinemia or simply a union of oxygen and iron in the blood instead of oxygen and hemoglobin, the natural state. The oxygen in this instance is retained in the blood and not exchanged normally. Another combination used is aspirin (acetylsalicylic acid), phenacetin and caffeine. The phenacetin adds the property of antipyretic (reduction of fever). Other effects similar to above.

f. Decongestant tablets. (Relief of colds, fever and prevention of allergy symptoms) Basic ingredients quite similar, usually as follows:

   (1) Phenylephrine hydrodoride. A stimulant of the sympathomimetic group. It is a local vaso-constrictor, elevates blood pressure, reduces swelling of nasal membranes. It is usually mixed with a local anesthetic to retard rate of absorption. Used in treatment of vasomotor collapse which is a condition where the nervous system cannot control the dilation and contraction of the blood vessels.

   (2) Phenindamine tartrate. An antihistamine. The tartaric acid may be detrimental to the kidneys.

   (3) Acetylsalicylic acid (aspirin). See aspirin described above.

   (4) An antipyretic (reduce fever) and analgesic.

   (5) Caffeine. A stimulant, produces wakefulness and respiratory stimulation. When combined with an analgesic it is used to relieve headache. Continued use may produce nervousness and insomnia.

   (6) Vitamin "C", (ascorbic acid): large dosage leads to gastrointestinal upset.

Annex II

Properties of the Human Eye Relevant to Sight Alignment

A. GENERAL

The principal difficulties which confront the shooter during aiming are determined by the

inherent characteristics of the organ of vision -- the eye -- and its work as an optical apparatus during the aiming process.

It is well known that the aiming process makes very exacting demands upon the vision, ince consistency and degree of accuracy are directly dependent upon the sharpness of vision and the conditions determining them. Therefore, it is necessary for the shooter to have a knowledge of certain of the optical properties of the eye. He must know the degree and the conditions under which the optical imperfections of the eye can affect the accuracy of aiming.

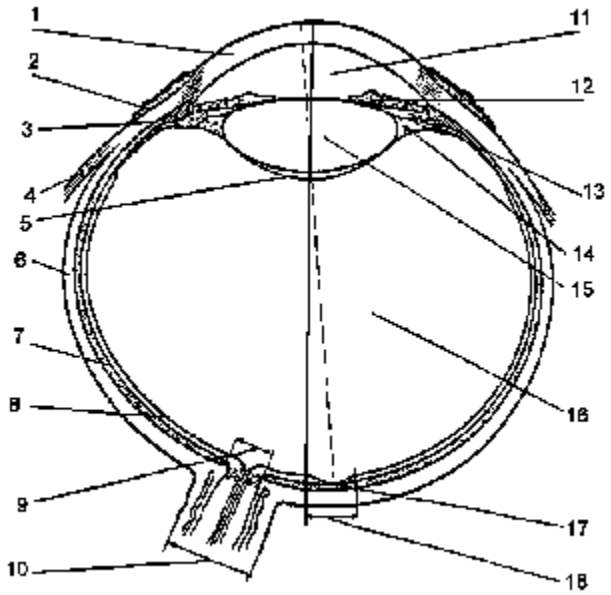


Figure A2-1. Horizontal Cross Section of the Human Eye (Right Eye)

1. Cornea (transparent, grasslike portion of coat of eyeball).
2. Conjunctiva (mucous membrane which lines eyelids and is reflected onto eyeball).
3. Ciliary muscle (smooth muscles, controlling alteration of crystalline lens).
4. Muscle of eyeball.
5. Space posterior to crystalline lens.

6. Sclera (toughest of the three membranes, forming the outer protective and supporting layer of the eye ball).
7. Choroid (vascular coat of the eye).
8. Retina (innermost tunic of the eye, containing receptors, rods and cones).
9. Optic disk (blind spot of retina).
10. Optic nerve (transfers images from retina to visual nerve centers located in the brain).
11. Anterior chamber (filled with aqueous humor).
12. Iris (opening in center is called the pupil, contains groups of smooth muscles that dilate and contract pupil).
13. Posterior chamber (filled with aqueous humor).
14. Suspensory ligaments (zonule of Zinn).
15. Crystalline lens (transparent biconvex body enclosed in transparent sheath, suspended from ciliary body by suspensory ligaments).
16. Vitreous (transparent jelly-like substance contained within transparent membrane close to retina).
17. Fovea central is (a pit in the middle of the macula lutea).
18. Macula Lutea (point of clearest vision, contains greatest number of cones).

B. OPTICAL PROPERTIES OF THE HUMAN EYE.

The human eye as a visual analyzer makes it possible to distinguish rather accurately between colors, form, dimensions, degree of illumination, and the location of objects in the immediate environment (Figure A2-1).

1. The forward portion of the eye, which is turned toward the light, contains a light-refracting apparatus which transmits the image to a light-sensitive membrane -- the retina; this apparatus consists of a system of refracting media and surfaces -- the cornea, the crystalline lens, the aqueous humor, and the vitreous humor filling the optical cavity. (The light-refracting apparatus also includes the ciliar humor and the iris, which has an opening, the pupil, in the center of it.)

2. The degree of illumination, the form and location of the objects surrounding us are perceived by the internal light-sensitive membrane -- the retina -- which is linked by means of the optic nerve to the cerebral cortex. In order to obtain the correct visual perception of any object, the image of it upon the retina must be sharp. This is achieved as a result of the eye's ability to adapt its light-refracting system and thus to obtain on the retina a sharp image of objects located at varying distances from it.

3. In our eye, the role of photographic lens is played by the crystalline lens which is a transparent, biconvex body similar in form to an ordinary lens. When the eye observes objects located at varying distances, the curvature of the crystalline lens changes, as a result of which the eye's optical system adapts by reflex and very rapidly to the perceiving of objects located at varying distances from us. As a result, the image produced on the retina is a sharp one and this makes it possible to perceive correctly and sharply the form and outlines of the objects surrounding us. This ability of the eye to adapt to the viewing of various objects located at varying distances from the eye by means of changing the curvature of the crystalline lens (changing the refraction) is called accommodation.

4. Consequently, the human eye is constructed in such a way that it is not able to see sharply, simultaneously, objects located at varying distances from it. Therefore, it is not possible when aiming, to see with identical sharpness the sight alignment and the target which is located at varying distances from the shooter's eye. Understanding this, one must not strain the vision excessively in vain attempts to see everything sharply at the same time.

5. The normal eye in the state of rest is set up to perceive distant objects, that is, it is set to infinity. In order to switch the vision to perceive objects located close by, it is necessary to exert a definite muscular effort. The mechanism of accommodation lies in the fact that the ciliary muscle contracts, and the crystalline lens takes on a convex form, thus increasing its refraction. As a result, when aiming, one must not abuse the eye by shifting the glance with excessive frequency, from one point of

clear vision to another. For example, a shift of focus from the rear notch and the front sight to the target, and back again. The protracted muscular effort expended under such conditions leads to the rapid and considerable fatiguing of the oculomotor muscles. For the same reason, the shooter must not aim for long sustained periods. He must make sure that in the intervals between sequences of aiming, he does not concentrate his glance on some object, but looks momentarily into the distance "with an absent-minded stare" in order to rest his eye muscles.

6. When there is a change in the force of natural illumination, the level of the eye's light-sensitivity changes and the eye adapts to the different amount of light entering it. A role similar to that played by the diaphragm in a camera is played by the pupil, the opening or aperture in the middle of the iris. Under the action of various eye muscles, the diameter of the pupil can be made narrower or wider. It is this action which regulates the amount of light entering the eye and which improves the depth of focusing of the image upon the retina when the pupil becomes narrower. The question of the speed at which the pupil reacts to a change in illumination is also deserving of attention. When the light changes to greater brilliance, the pupil contracts much more rapidly than it expands after finding itself again in conditions of lesser brilliance. For example, the contraction of the pupil to the stable level of average light intensity takes about 5 seconds, but the process of its reverse dilation after the stimulus created by low intensity light requires about 3 minutes. From this the shooter must also make the corresponding conclusions: in order to preserve the eye's working efficiency without reducing the accuracy of aiming, before or during aiming, one must not look at brightly illuminated objects or, moreover, subject the eye to the action of sharp transitions from light to shadow. In the intervals between shots, one must not rest the eyes by closing them. Between shots, it is necessary to rest the eyes, but the best way is to look at distant dull surfaces having even tones of gray, green, or blue.

C. FUNCTION OF THE HABITS OF THE NORMAL EYE.

All shooters should make a conscious effort to improve the condition of their eyes in the intervals when they are not actually aiming by allowing the habits of normal sight of function. The following will give an idea of how this should be done. There are three things that every healthy eye does: Blink, center its attention (called Central Fixation) and shift.

1. Blinking, the first habit of normal sight an involuntary action. The blink is the quick, light, easy closing and opening of the eye, and it is done intermittently by every normal eye. The rate of blinking varies with people and also varies with the use an eye is put to. You blink more, for instance, when you look at something brilliant than you do when you look at something soft in tone.

    a. Frequently the dividing point between a normal and abnormal pair of eyes is its impulse to blink under a given situation. If the eyes are perfectly normal, they will blink; suppression of the act of blinking shows a tendency to become abnormal.

    b. The action of the eyelids in blinking is most essential to normal eyes and sight. The fluid that keeps the eyes moist is produced by a small gland called the lacrimal gland under the outer portion of the upper lid. When one blinks, this fluid is washed down and over the eyeball and keeps the eye moist.

        This moisture has several functions:

        (1) There is a definite antiseptic and cleansing action of the fluid.

        (2) The brilliance of the eyes and their ability to reflect light are largely due to the fluid on their surface.

        (3) The fluid is essential to the cornea, which is the small translucent front part of the eye. Since the cornea has no blood vessels, it needs this fluid to keep it moist or it may develop corneal ulcers.

        (4) When particles of foreign matter get into the eye, the lacrimal fluid tends to float them off, while on an eye that is dry, the particles may stick and imbed themselves.

        (5) In cold weather, frequent blinking tends to keep the eye warm. An eyeball can be very uncomfortable when cold.

(6) In strong wind or when the weather is very dry, blinking comforts and protects the eye. Under these conditions, one should blink frequently, almost continuously, because the fluid is lost so rapidly.

(7) In the short interval of blinking, the muscles of the pupil have a chance momentarily to relax their tension.

(8) Blinking also enables the eye to move slightly and thus allows the recti muscles to make the small amount of movement essential to their well-being, since motion is necessary to the health of any muscle.

(9) The circulation of the lymphatic fluid around the eye is aided by blinking, and the eye is strengthened by this good circulation, just as any body is benefitted by keeping the circulation of the blood active around it.

c. Blinking is not an interruption of continuous vision. Continuous vision is the illusion that a normal eye produces, authentic in effect but nevertheless an illusion. When an image falls on the retina, there is another image or an after-image produced. In other words, the image remains on the retina for a short period longer than the image is kept before the eye. It is as if your image in the mirror, stayed there a moment after you had gone away.

Thus, it is not necessary for the eye to be seeing actively all the time in order to produce the illusion of seeing constantly. In fact, nothing in the body works more than half time or so much as half time. More than half of the time of every organ is consumed in the repair and replacement of its own tissue and the elimination of its waste products.

d. The frequency of the visual impressions made by the eye is between thirty and forty images per second in the average person. Therefore the blink does not interfere with constant vision. It is possible for the eye to blink so frequently that the eye is closed half of the time and yet it will see as much as if it were open all the time.

e. In fact, blinking increases the actual amount of time you may actively see, since failing to blink constitutes strain and this may reduce the number of images from thirty or forty to twenty or fewer images per second. There is no single instance where blinking interferes with sight. It is a natural, constructive performance and improves the eye. If for some reason the eye has not been blinking normally, the resumption of normal blinking improves its vision.

f. Do not confuse a wink or a spasm of the eyelid with blinking. A spasm of the eye lid is a forceful, involuntary constriction of the lid and usually involves the muscles around the eye as well as the muscles of the eyelid and is frequently associated with some nervous disease. A blink is a light, easy, smooth, barely noticeable movement of the eyelid.

g. If you have formed a habit of looking too fixedly at things, remind yourself to blink. Blink consciously and often. Condition your reactions until you again have the unconscious blink.

2. Central fixation: The second habit of normal sight is to have the eye and the mind so coordinated that they fix on a small area at one and the same time. In other words, when you look at an object you should localize your attention, fasten it on the one small area, not scatter it.

a. For example, when you look at a page of print, you cannot see the whole page clearly. If you fix your eyes on the upper right-hand corner of the page, you can see that clearly, but the remainder of the page, although it is within your field of vision, is much less clear. To see the last word on the page clearly, you will have to shift your eyes so that they are directed straight at that word.

b. The same is true if you take words quite close to each other. To see the first word of a line clearly you must look directly at it, and to see the last word on that line it is necessary to shift the eye. The same is true if you want to see the second word on the line clearly. You can see it well enough to read it, but you do not see it perfectly clear when you are looking at the first word. A definite strain is involved if you try to see it that way. This is true down to the very smallest degree of space.

c. There is a basic, structural reason for this. The Macula Lutea, the only part of the eye that sees perfectly clear, is in the center of the retina and is no larger than the head of an ordinary steel pin. This dot of perfect sight is placed in the eye like a point at the bottom center of a bowl whose

sides slope gently like an arena. This one tiny point has clear, strong vision. When your vision departs from that point, there is a tremendous reduction in clarity of sight. There is, instead, blurred, collateral vision. And this is increasingly blurred as you continue out from the center until near the outside edge there is only perception of general shape, color and motion.

d. Since only this point, the Macula Lutea, has perfectly clear vision, only a very small area can be seen clearly at one time. But the movement of shifting is so swift that the illusion of seeing a large area is given. The images falling on the Macula Lutea are carried swiftly into the visual brain centers, one succeeding another with such rapidity that there are thirty or forty and sometimes more images a second, thus creating the illusion of a whole picture in the brain.

e. This ability of the brain to carry successive images and so produce the illusion of clearly seeing the whole object or a considerable area is an impressive and beautiful fact, but it is also a cause of trouble to the shooter. One comes to believe that the eye itself can see a large area clearly, and so misuse slips in because any attempt to do this is to use the eye without focusing!

f. "Large Area" means trying to see for example, two words or more at a time. The healthy, normal eye habitually sees only a very small area at given moment. The mind and the eye normally coordinate perfectly on each word or point of observation with no effort or impulse to see more, just as it does when one is writing.

   If the practice of seeing a large area at one time persists over a sufficient length of time, the ability to focus perfectly is lost and the blurred vision naturally to the collateral area is the only vision possible. It is then necessary to retrain the eye and mind to look at only a small area in order to again have central fixation without which no vision can be clear and normal.

g. One can read indefinitely without undue tiring or harming the eyes in any way if the eyes are relaxed and the vision is localized. But, if the seeing power of the collateral field of vision is used, the eye is straining and there is a resulting fatigue and loss of efficiency.

   The fact that the eye sees clearly only a very small area at any one time cannot be over stressed. In the awareness of this fact rests the coordinating of the mind with the structural limitations of the eye, without which there cannot be normal vision.

   If you grasp this fact of focused vision and mentally close your sight to a large area, you will attain this valuable habit of central fixation and find increased efficiency in the use of your eyes in shooting.

3. Shifting. The third beneficial habit of normal eyes is to shift. This seems to quarrel with the second habit which is to localize your gaze but in reality it does not. You must point your gaze, but you must, too, constantly shift your point of vision.

   If you do not shift it, you will stare, and staring is one of the worst and commonest forms of eye strain.

   a. Shifting is a normal function and is normally done unconsciously. The frequency with which your eyes shift varies with the type of demand upon the eyes; for instance, looking at a book or watching a tennis match. The book is stationary and the eyes do not tend to move, while the tennis balls and players are constantly in motion so the eyes must move continually in order to follow them.

   b. But, in any event, shifting should be as frequent as possible. The time required for an image to register on the retina, about 1/50 of a second, allows for a great frequency of shifting with no loss or interruption of vision.

   c. People who are inclined to look at one area too long, and every abnormal eye does this, would benefit both in vision and in eye comfort if frequent shifting from the point being looked at is consciously practiced. If your vision is abnormal; without wearing your glasses look at a word, then look at a word three word spaces beyond it; then back up to the original word. Do this until both words become clear. Be relaxed while you practice.

   d. Or, if your vision is good; look at the moon and while blinking frequently, shift your vision from one point to another on the moon. Do this a number of times and the moon will stand out much more clearly and appear in its true form as a solid spherical body with depth and shape instead of a flat disc.

e. Shifting is both voluntary and involuntary in character. The involuntary shift is continuous, automatic and very slight. This movement is not visible and is believed to correspond in frequency with the rate of image production in the retina.

f. There is in every muscle a faint tremor, since muscle tone is not a constant factor but is a rapid succession of contractions producing a relatively steady muscle pull. And, since the eyes are held in position by muscles and all focusing is produced by these muscles, the eyes are naturally subject to all conditions that muscles produce incidental to their normal functioning.

g. When the eye is relaxed, the voluntary shifting is frequent and the movement is short in scope. The tense eye can make a large movement, but it requires relaxation and normality for an eye to keep shifting in relaxed condition with a very small movement. This is true of all muscles -- the finer the movement, the better trained and the more relaxed must be the muscle. When an eye is strained and the vision is abnormal, practice in shifting frequently will give relief from the strain and produce improvement in the vision.

h. An exercise that accomplishes this is to focus definitely on each word and consciously shift to the next one. A few minute's practice each day will make this an unconscious habit.

i. Normal shifting is absolutely essential to normal sight. Loss of vision is frequently in direct proportion to the loss of motion.

4. In addition to acquiring the three habits described above, a shooter may find it desirable to strengthen his tolerance for light. This may be done as described in the following paragraphs:

a. Sunlight is very beneficial to the eyes. It both relaxes and stimulates. But it is necessary to know how to use the sunshine to get the most out of it. Sunlight directly on the eyes may cause great damage. The eye can be strengthened in its light tolerance by judicious exposure to light. One of the most effective and simple ways of strengthening the eyes is to expose them to the sun's rays in the following manner:

(1) Close the eyes lightly as the face is turned directly toward the sun. Keeping the eyes closed, slowly turn the head from side to side. Keep this up for four or five minutes. Then, when the eyes are relaxed from the heat of the sun and the motion of the head, they may be opened, but only momentarily, and when the head is turned to the side. The eyes must not look directly at the sun but may look near it. Make no effort to see, and open the eyes only in flashes. As this exercise is continued, and the eyes become accustomed to the increased light, the glance may be directed closer and closer to the sun.

(2) By doing this with regularity on successive days and for a gradually increasing length of time, any eye will be strengthened and its vision improved.

b. The eye is admirably equipped to protect itself and function under widely varying light conditions. When the natural protective mechanism is used, as just outlined, strong light will be handled easily by the eye.

D. OPTICAL IMPERFECTIONS OF THE HUMAN EYE.

As a result of various optical imperfections of the eye, the images of objects on the retina have edges which are not completely sharp, or are to a degree totally fuzzy. As a consequence, there exists a certain limit of varying sensitivity of our eye which determines the sharpness of vision. It must be said that sharpness of vision, in and of itself, is inconstant. It has a certain variable value which depends upon the degree and the conditions under which, the optical imperfections of the eye have a noticeable effect. Therefore, the shooter must know, at least in overall features, the conditions which influence the sharpness of vision and thus the degree of accuracy of aiming.

As an optical instrument, the eye has inherent in it, the phenomena of aberration and diffraction of light.

1. Spherical aberration is a function of the eye in which rays of light falling upon the crystalline lens are refracted differently and are not focused at a single point. The extreme outer rays are refracted more strongly than the central ones (Figure A2-2). As a result of spherical aberration, a beam of parallel rays entering the eye is focused on the retina not in the form of a sharp image, but in the form of a

circle of light diffusion. The size of the circle of light diffusion resulting from spherical aberration is in direct proportion to the size of the pupillary opening. It is obvious that the sharpness of the image is increased if one eliminates extreme rays. Consequently, as the pupillary opening contracts, the sharpness of the image of the object upon the retina increases.

The degree to which spherical aberration can hinder the seeing of objects sharply, and to which the sharpness of the image depends upon the size of the pupillary opening, can be convincingly shown to the shooter by means of a simple example. Small orienting marks and objects which can be distinguished only with difficulty during overcast weather become incomparably more discernible if one looks at them through a small peep hole which, in this instance, fulfills the role of an artificial pupil.

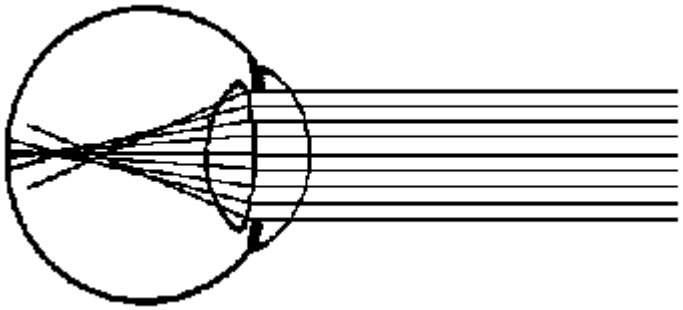


Figure A2-2. Phenomenon of Spherical Aberration.

2. The phenomenon of light diffraction lies in the fact that light rays passing through small openings, particularly through the crystalline lens; seem to bend (figure A2-3) and produce on the retina an image not in the form of a single sharp point, but in the form of a circle surrounded by a number of concentric light rings of decreasing sharpness. This occurs as a result of the wave nature of light.

    a. As the pupillary opening decreases, the diameter of the diffraction ring of light diffusion increases. The diffraction rings around the images have a noticeably telling effect only when there are extremely small dimensions of the pupil, and this, as we can see, is a certain opposite of the phenomenon of spherical aberration. The phenomenon of diffraction makes itself felt when there is solar illumination from the front and the sun in shining into the eyes; when there are bright patches of sunlight on the horizontal surfaces of the front and rear sights, etc.

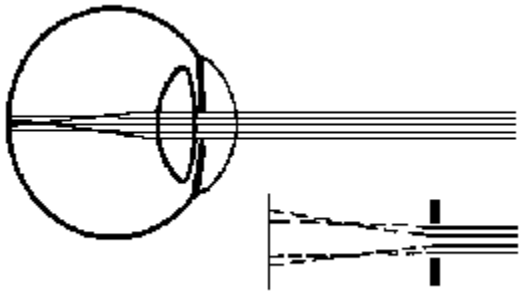


Figure A2-3. Phenomenon of Diffraction of Light on the Pupil.

    b. The operation of the eye as an optical apparatus is also harmed to a certain degree by the light diffusion occurring with in it. It is especially discernible when one views brightly illuminated

objects located against a dark background. The effect of light diffusion in the form of a more or less noticeable radiation, covering the field of vision, is caused by media which do not possess absolute transparency -- the crystalline lens and the vitreous humor. The light diffusion in the optical media is responsible for the halos of light. They are especially noticeable where the targets are strongly illuminated by sunlight. In such an instance, the white background of the target casts a sharp reflection and causes a considerable light diffusion in the optical media. This causes a blinding effect. Both the bull's-eye, perceived by the eye in the form of a gray spot with indistinct edges, and the front and rear sights are perceived with unclear outlines.

c. It is obvious from what has been said that the amount of light diffusion from spherical aberration is in direct proportion to the size of the opening of the pupil, and the amount of light diffusion from diffraction is in inverse proportion to the size of the opening of the pupil, and thus it is not possible to eliminate these types of diffusion completely. As a result of this inverse dependence of the effects of aberration and diffraction upon the size of the pupil, the best conditions of sharp vision correspond to a certain average size of the pupillary opening -- a diameter of approximately 3 mm.

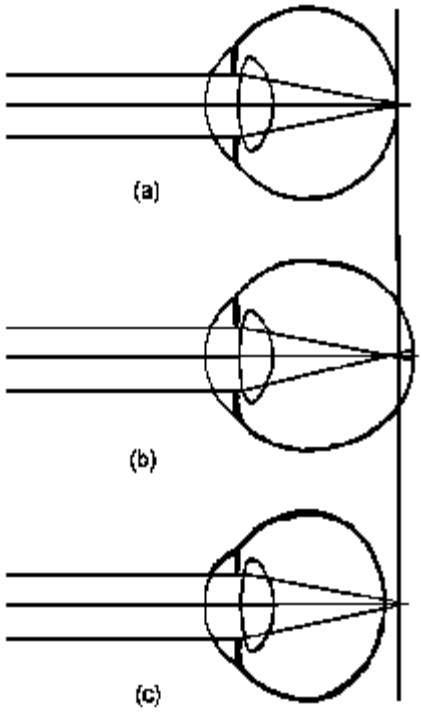
   Taking this into consideration, depending upon the conditions of illumination which influence the size of the pupillary opening, the shooter must strive, insofar as he can, to create the most favorable conditions for the operation of the eye. He must protect his eyes from the action of light by using visors, filter type shooting glasses, or by possibly using an artificial pupil. An eye disc device is attached to the shooting glasses with adjustment for varying diameters. He must also make sure that the sights do not shine and thus produce a blinding effect upon the eye: They must be carefully and evenly blackened.

d. Brilliant sources of light harm the eye chiefly by means of the violet sector of the visible and invisible portions of the spectrum. The complete elimination of the violet sector of the spectrum is achieved by yellow, yellow-green, and yellow-orange light filters. Such light filters not only do not reduce the acuity of visibility, but, on the contrary, increase it. Type of darker glass protecting the eyes from brilliant sources of light somewhat reduce the acuity of vision. However, by having an assortment of shooting glasses of varying shades, it is possible to select and use them in such a way that the shooter's eye perceives the correct sight alignment under the brightest illumination in almost the same way that he does during overcast weather.

3. Near sightedness, farsightedness and astigmatism: The optical imperfections of the eye also include nearsightedness, farsightedness, and astigmatism, the existence of which also hinders the correct focusing of the optical system of the eye and the obtaining of sharp images of objects upon the retina.

   a. If the eye is constructed in such a way that rays of light entering it in a parallel beam are focused exactly on the retina without any effort at accommodation, we say that the eye is a normal one. (Figure A2-4(a)).

   b. The eye is nearsighted if the rays entering it in a parallel beam are focused in front of the retina (Figure A2-4(b)). Nearsightedness is caused either by the fact that the eyeball is excessively long from front to back or by the fact that the eye has great refracting force, or by a combination of both factors. Nearsightedness can be corrected comparatively easily by means of eye glasses. Many pistol shooters suffer from nearsightedness, but this defect of vision, after being corrected by the proper choice of eyeglasses; does not prevent them from achieving record-making competitive results.



Figures A2-4. Schemes Showing the Refraction Rays in the Eyes: {a) Normal, (b) Nearsighted (c) Farsighted.

c. The eye is farsighted if the rays entering it are focused in back of the retina (Figure A2-4(c)). This can occur either as a result of the eye having a weak refracting force, or that the eye is too short from front to back or by a combination of both factors. In such an instance, in order for the rays to focus upon the retina, they must enter the eye in a converging beam, and therefore a farsighted eye sees near objects worst of all. This type of eye is harder to correct but eyeglasses help it overcome the difficulty. Shooter's suffering from farsightedness will see the sights very poorly. The characteristic complaint of farsighted persons is that the rear notch seems to fuse with the front sight.

d. An indistinct, hazy image of objects on the retina can also result from astigmatism of the eye.

   (1) An eye in which the refracting surfaces of the cornea and crystalline lens do not have a perfectly spherical form is called astigmatic. When an eye is astigmatic, parallel rays entering the eye cannot produce an exact focused image on the retina. The refraction of the light rays at various points in the eyeball occur at different angles. As a result, the eye possesses not a single principal focus, but several foci, which are located at various distances from the retina; that is why the image on it is indistinct and uneven (Figure A2-5). It must be said that certain strange phenomena frequently observed under practical conditions of marksmanship (for example, when two shooters are firing the same pistol, with an identical sight setting, and the centers of impact differ sharply from one another) are, in all probability, connected with astigmatism of the eye.

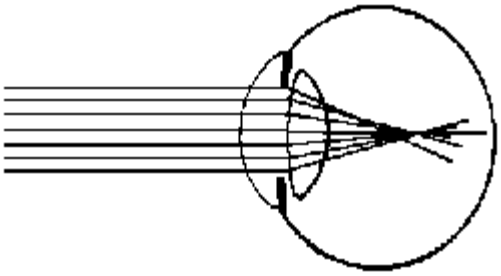


Figure A2-5. Scheme showing the Refraction of Rays in an Astigmatic Eye.

(2) One can easily be convinced of the existence or absence of astigmatism by making use of a circle chart (Figure A2-6). For this purpose it is necessary to look with one eye from the distance of best vision (approximately 10 feet) at a disk on which concentric circles are drawn. If the person has astigmatism, only certain areas of the disk will be clearly visible and the remaining areas will seem hazy.

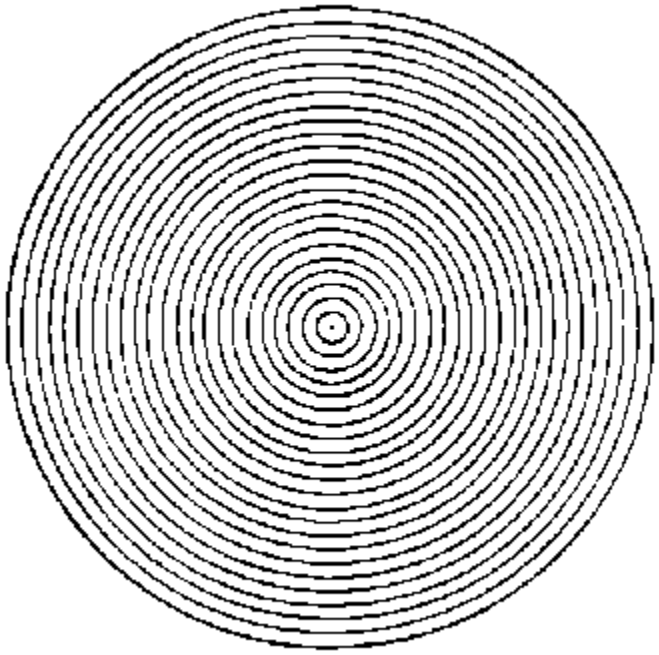


Figure A2-6. Chart for Discovering Astigmatism.

4. Correction of Defects: If even insignificant defects in vision are discovered, it is necessary to wear corrective eyeglasses when firing, since the excessive accommodation of the eye resulting from aiming will greatly fatigue vision and this can lead to a still greater decrease in its accuracy. It must also be kept in mind that when eyeglasses for firing are chosen by the ordinary method, that is, in an optometrist's office, the choice is not completely satisfactory for the shooter. It is very desirable when selecting the lenses to check them immediately on the pistol range, to make sure that one can see

well the sight alignment located at arm's length distance away from the eye. This selection is linked not so much with the determination of the lens dioptrics, as with the determination of the quality of their grinding, since all defects will make themselves known quickly during such a check.

When wearing shooting glasses (including those with filter lenses) it is necessary to make sure that the line of sight runs perpendicular to the surface of the lens and through its center, since the central portion of the lens is usually ground considerably better and therefore has less distortion of the vision. To hold the lenses perpendicular to the line of sight requires no change in the ordinary level placement of the head when assuming the firing position.

E. MONOCULAR AND BINOCULAR VISION.

It is necessary to dwell on one more peculiarity of our eyes which has tremendous importance in aiming -- the existence of monocular and binocular vision.

1. Vision with one eye is called monocular and vision with two is called binocular. The fact that a person has two eyes does not always mean that he also has binocular vision.

   There are instances when the eye which has the poorest vision is not included in the act of vision and the person actually uses just one eye, the better one. The dominance of one eye over the other also occurs, even when both eyes possess identical sharpness of vision. The eye that the person prefers to use is called the dominant, or directing eye. There exists a very simple method by which one can determine which of the eyes is the stronger.

2. In order to determine which is the dominant eye the shooter must hold his hand out slightly making a ring out of the fingers and thumb, and look through it in such a way that some small object can be seen by both eyes (Figure A2-7). Then, by alternately closing one eye then the other, it is necessary to see whether the object stays within the ring or leaves it. The dominant eye is the one with which the shooter sees the object as un-shifted, remaining in the ring. In most people the dominant eye is the right one.

3. The protracted work of one eye (for example, by laboratory assistants, microscopists) contributes to the fact that the eye used becomes the dominant one. This naturally pertains also to shooters, who, when aiming, use one eye. The right eye is, in the overwhelming majority of cases, their dominant one.

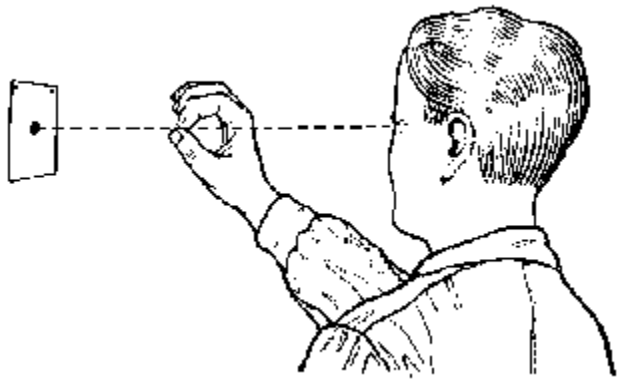


Figure A2-7. Determining which eye is dominant.

4. In the past the shooter has usually been instructed to squint his left eye and aim the pistol at the target with his right eye. During subsequent instruction it is no longer necessary to continue this device of closing the eye, since it has its major shortcomings, which are attested to by numerous instance of medical research.

a. The first shortcoming is the strain which is involved in squinting the eye and is hard for most people to endure. Another undesirable aspect is the fact that the squinting of one eye is almost always accompanied by the tension and pressure of the closed lid on the eyeball. This pressure of the eyelid upon the eyeball affects the refraction of the crystalline lens and thus has an adverse influence upon the sharpness of vision of the open eye. The third factor having an adverse effect upon the accuracy of fire is the involuntary sympathetic dilation of the pupil of the open eye in response to the closing or squinting of the other eye. Thus, when excluding the second eye from work, it is best not to squint but suppress the visual impressions of the open left eye with an opaque disc which will allow equal light intensity to affect the eye.

b. With binocular aiming, that is, with both eyes open, the line of sight still is achieved with one eye. Consequently, this method does not involve anything new in principle and therefore the shooter is not required either to learn something new or to relearn something, but must simply stop closing one eye when aiming.

5. Binocular aiming has a number of major advantages: The shooter does not have to expend the additional effort involved In squinting the eye, and this is very important when he is engaged in prolonged firings. The binocular acuity of vision is usually better than the monocular. The visual perception of one eye intensifies the total stimulus sent to the central nervous system from the visual perception of the other eye. In such aiming, the stimuli sent by two eyes are more natural than those sent by a single one.

6. All the movements of the eyeball, as well as the holding of its fixed position at moments when the glance is fixed on some object, are effected by the work of three pairs of eye muscles. During the time when the eyes are at work, including the times when the eye is aiming, these muscles are in a state of indiscernible, slight vibration or quivering. For example, when aiming a pistol and the shooter turns his head down and to the right, the eyeball turns respectively upward and inward, it is held in the least desirable position; one that requires the combined, intensified work of all three groups of muscles (Figure A2-8). When the eye muscles become fatigued, the involuntary quivering of the eyeball increases considerably and this lessens the accuracy of aiming. Therefore, the shooter must devote major attention to the position of his head when firing. He must select that firing stance in which the head position is the most natural one, with the least amount of tilt, so that the shooter does not look at the target from under his eyebrows or sideways. This results in the rapid fatigue of the eye muscles and, hence, the lessening in the accuracy of aiming.

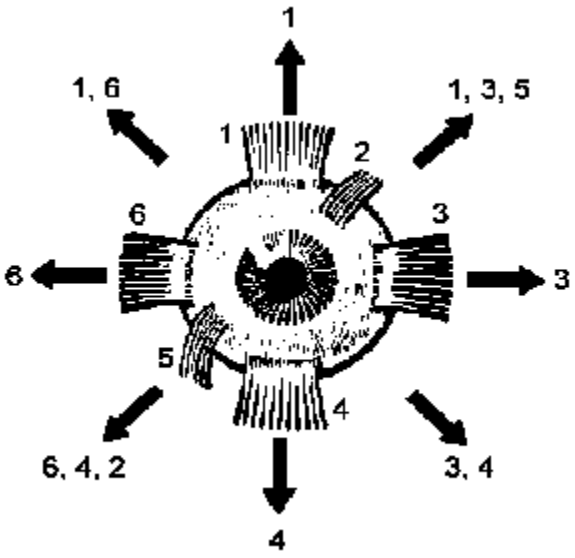


Figure A2-8. Muscles of the Right Eye. Arrows Show the Direction in which the Eyeball turns when the Muscles designated by the numbers are contracted.

F. THE SHARPNESS OF VISION.

The shooter is interested chiefly in the degree of the eye's differentiating sensitivity and its resultant sharpness of vision, as well as the degree of accuracy of aiming which the eye can guarantee.

1. Basically, sharpness of vision depends upon the physical properties of the anatomy of the eye. The physical condition of the eye determines primarily the greater or lesser accuracy of the image of the object upon the retina. Those anatomical and physiological conditions determine how well we can see the object. The sharpness of the image upon the retina is the impression received by the brain.

2. Sharpness of vision is usually determined by the minimum space that we are able to see between two objects. In order for this space to be visible, it is necessary for at least one retinal element lying between the images of those two points to be stimulated. Thus, the normal sharpness of vision is generally considered to be that at which the eye can distinguish between two visible points at an angle of one minute.

3. However, the anatomical dimensions of the retinal elements (the rods and cones) do not completely determine the limit of visual acuity. Therefore, the visual acuity of the normal eye actually can be considerably greater than the medical norm. Research works have shown that the average visual acuity of the normal human eye, at one hundred yards under normal illumination, can distinguish distance between objects separated from one another within the limits of 40 angular minutes. This means that the normal eye can distinguish sufficiently clear, for example, a space of .1 inch between the side of the front highs and vertical inside surface of the rear sight notch on the pistol sight at a distance of one yard (the approximate distance to the muzzle and front sight). But the eye of an experienced shooter can distinguish a considerably smaller space between two objects. A number of experiments carried out by specialists attest to the greater accuracy of a trained shooter's sharpness of vision. For example, the vertical space between front and rear sight against a white background can be discerned down to the minute width of .01 inch.

4. Many experiments confirm that the sharpness of vision can be considerably increased by means of exercises. This increase in the sharpness of vision is achieved by searching for new signs, new criteria for recognizing the form of objects. Such a sign for shooters is undoubtedly their highly developed sense of symmetry and visual memory.

5. Visual Memory: Therefore, in order to achieve symmetry, a visual memory of correct sight alignment, with its symmetrical interrelationship of the front and rear sights, mainly, the equal amount of space between each side of the front and rear sights and the levelness of their horizontal surface must be ingrained into the mind and never violated. No shot should be fired with less than perfection. All these factors, together with an existing sharpness of vision, will provide for accurate and consistent aiming and the accurate calling of the shot.

6. Calling of the shot: Accurate calling of a shot is dependent upon exact recall of the mental image of the sight alignment at the instant of firing. As demonstrated, the presence of 1/100th of an inch error in sight alignment will result in approximately a 3 inch error from target center at 50 yards. Acute awareness of the slightest degree of error in alignment is an absolute requirement of accurate shot calls from a clear visual memory. The overwhelming majority of shooters try to see the front sight sharply, and thus accept the blurring of the bull's eye. With the passage of time and with regular practice, the eye develops the ability to obtain the identical space relationship between the front sight and the rear sight and with increasing frequency can position the sights uniformly in the center of the aiming area which is blurred and out-of-focus.

   Eventually, the shooter develops his visual powers to such an extent that the eye will consistently perform the act of aiming automatically and he can call his shots without error.

7. Changing degrees of accuracy: When the eye performs intensified work, not only the motor apparatus of the eye, but also its light-sensory apparatus has reduced efficiency. When the glance is fixed steadily upon some object, the eye possesses its greatest sharpness of vision for the first several seconds, after which the sharpness of the image on the retina, that is, the clear seeing of it, gradually decreases. Consequently, the shooter must not be captivated by excessively prolonged aiming, since, after the elapse of 12-16 seconds, his eye ceases to notice certain inaccuracies in aiming. By relying on the false assumption that the rear sight and front sight are in correct relationship to one another, the shooter makes grievous errors without noticing and therefore, does not know why they were committed.

a. If one calculates the time between the moment when the visual attention is concentrated on obtaining the precise alignment of the front and rear sights and the moment when the shooter makes the decision to positively press the trigger, the aiming process must not exceed 6-8 seconds.

b. When aiming, some shooters run their eye from the front sight to the rear sight notch and then to the third object, the target, doing this quickly several times, until these three points are all located on the same line. It must be said that his method of aiming causes rapid fatiguing of the muscular apparatus of the eye and fails to provide a constant objective for the formation of a visual memory. With this method of aiming it is very difficult for the shooter, for example, to conduct rapid fire, which is very limited in time. He simply does not have time to run his eye back and forth between objects located at varying distances. The shots may be fired when he is focused on any of the three objects. Consistently accurate shot calls are impossible. Therefore, when aiming, the shooter must strive to see only the front sight sharply and distinctly.

GLOSSARY OF TERMS

ASSEMBLY AREA is a designated zone in the rear of the firing line, approximately 25 yards, where the next relay of competitors can complete their preparations for the match and receive instruction and advice from their coach or team captain.

AIMING AREA is the center area of the target as against an aiming point on the target which is extremely difficult to attain due to the universal presence of movement in the shooter's hold.

BREATH CONTROL is the ability to temporarily suspend breathing while firing a shot without being conscious of the need to take another breath. This awareness disturbs the shooter's concentration on maintaining perfect sight alignment.

BALL AND DUMMY is a training exercise wherein the shooter makes an effort to employ all the control factors for firing a good shot. The ammunition inserted into the pistol by the coach is a random selection of live or dummy ammunition. This training aids the shooter in overcoming reaction to the recoil and loud noise of firing, preventing uncontrolled reflexes from disturbing the hold, and perfecting sight alignment.

THE CENTER FIRE PISTOL FOR INTERNATIONAL COMPETITION is similar to the pistol used in NRA domestic competition. The trigger pull is three pounds as compared to the NRA requirement of 2 1/2 pounds. Caliber .38 is the normal size used.

DRY FIRING is a training exercise wherein the shooter employs all the factors of controlling the firing of an accurate shot without using live ammunition.

FOLLOW THROUGH is the effort on the part of the shooter to continue the employment of the fundamentals throughout the deliver of the shot exactly as they were planned and set-up.

THE FREE PISTOL is a special design of competitive weapon for achieving the ultimate in accuracy from a handgun. It is 22 caliber long rifle. The majority of free pistols have a longer barrel than the normal pistol and an extended sight radius. The trigger weight is extremely light and is adjustable from 1/2 oz to 1 1/2 ozs. There is a form fitting grip for the hand.

THE FUNDAMENTALS OF PISTOL MARKSMANSHIP are those essential factors that the shooter must know and learn to control in order to fire an accurate shot.

THE GRIP of the shooting hand on the pistol provides the shooter with a firm hold on the weapon that prevents shifting during recoil and a natural alignment of the sights without moving the head or wrist from their normal attitudes.

HARD BALL ammunition is the term used to describe the .45 caliber service type of pistol ammunition.

INTERNATIONAL SHOOTING UNION is the organization that sponsors and controls all international firing competitions between nations. The headquarters is in Weisbaden, West Germany.

MENTAL DISCIPLINE in pistol marksmanship is the shooter's ability to maintain his concentration on sight alignment while the other fundamentals of minimum arc of movement and trigger control are being employed at their optimum.

MINIMUM ARC OF MOVEMENT is the smallest degree of movement that the shooter can attain in the body shooting arm and weapon during the time of firing a shot.

THE NATIONAL MATCH COURSE OF FIRE is a three stage pistol match. The first stage is ten shots in

ten minutes, fired at 50 yards. The second stage is two strings of five shots each timed fire, 20 seconds each string at 25 yards. The third stage is two strings of five shots each rapid fire, ten seconds each string at 25 yards for a total of 30 shots.

POSITIVE PRESSURE on the trigger is an uninterrupted, constantly increasing pressure applied by the trigger finger in an effort to fire the shot. This pressure is initiated by the presence of a satisfactory minimum arc of movement in conjunction with perfect sight alignment, not perfect sight picture. A perfect sight picture is the absence of movement combined with perfect sight alignment.

POSITION of a pistol shooter is the relationship of the shooter's body to the target. Proper or natural positioning of the shooter's body points the shooting arm directly at the target center without deviation.

RAPID FIRE is a type of pistol match or a stage of the National Match Course of fire where a string of five shots are fired consecutively during a period of ten seconds. A Rapid Fire Match is a series of four such strings and the National Match Course includes two strings.

THE RAPID FIRE PISTOL is a special design of competitive 22 caliber short weapon for firing in international rapid fire competition. It's outstanding characteristics are minimum recoil, dependability and fast semi-automatic operation.

SQUADDING TICKET is a card issued to each shooter in a pistol match that indicates the caliber of weapon, the relay of firing, and the target number for each of a succession of matches scheduled to be fired during the tournament.

SLOW FIRE is a type of pistol match or a stage of the National Match Course of fire where a period of one minute is allowed for each of a maximum of 10 or 20 shots.

SIGHT ALIGNMENT is the relationship of the front sight to the notch of the rear sight as seen by the shooter's eye. The top of the front sight must be level with the top of the rear sight and the light space must be equal on each side for the front sight.

STANCE is the posture assumed by a pistol shooter while firing a shot.

THE INTERNATIONAL STANDARD PISTOL is similar to the caliber .22 weapons used in domestic NRA competition. The barrel length is limited to 15 centimeters and the trigger pull is limited to 1000 grams.

TIMED FIRE is a type of pistol match or a stage of the national match course of fire where a string of five shots are fired consecutively during a period of 20 seconds. A timed fire match is a series of four such strings and the National Match Course includes two strings.

TRIGGER CONTROL is the ability of the pistol shooter to apply pressure on the trigger to fire the weapon without disturbing sight alignment.

WAD - CUTTER pistol ammunition has a type of bullet that is shaped to cut a clean hole in the target face. This sharp edge enables the scorer to readily and accurately evaluate the hit.

ZEROING is the technique of setting your sights so that a shot called good, (undisturbed perfect sight alignment and minimum arc of movement) will hit the center of the target on an ideal day with no wind.

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